

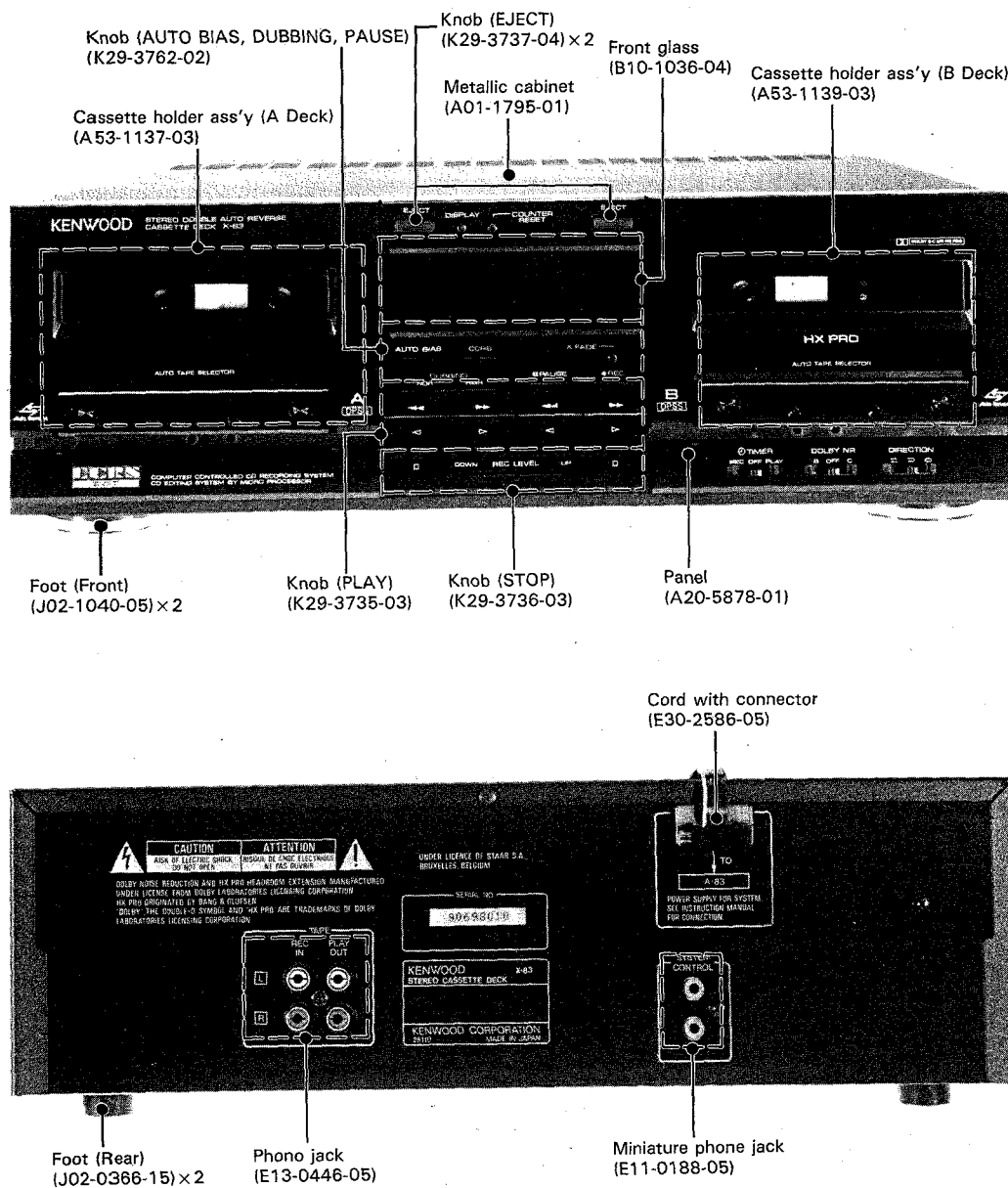
STEREO DOUBLE AUTO REVERSE CASSETTE DECK

X-83

SERVICE MANUAL

KENWOOD

©1989-8 PRINTED IN JAPAN
B51-3934-00(T) 1175



PRECAUTIONS FOR REPAIR

MIDI M-83 Cassette Deck is not provided with a power supply. For repairing the cassette deck, use the amplifier's

power supply section or another provisional power supply.

CONTENTS

METHOD OF SUPPLYING POWER FOR REPAIR.....	2	MECHANISM OPERATION DESCRIPTION	37
CONTROLS AND INDICATORS.....	3	ADJUSTMENT	45
RECORDING CD SOUND (CCRS)	4	REGRAGES	46
DISASSEMBLY FOR REPAIR	7	ABGLEICH	47
BLOCK & LEVEL DIAGRAM	8	PC BOARD (Component side view)	51
CIRCUIT DESCRIPTION	9	PC BOARD (Foil side view)	55
MICROPROCESSOR OPERATION SPECIFICATION	12	CIRCUIT DIAGRAM	59
IC14: PD75112CW-031 (X28-2070-00)		EXPLODED VIEW (MECHANISM)	67
Microprocessor (Master)	29	EXPLODED VIEW (UNIT)	68
IC1: μ PD7537 ACU-214 (X25-3700-00)		PARTS LIST.....	69
Microprocessor.....	33	SPECIFICATIONS.....	Back cover

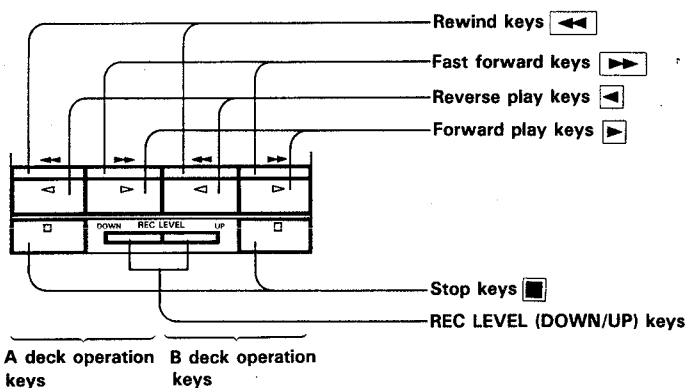
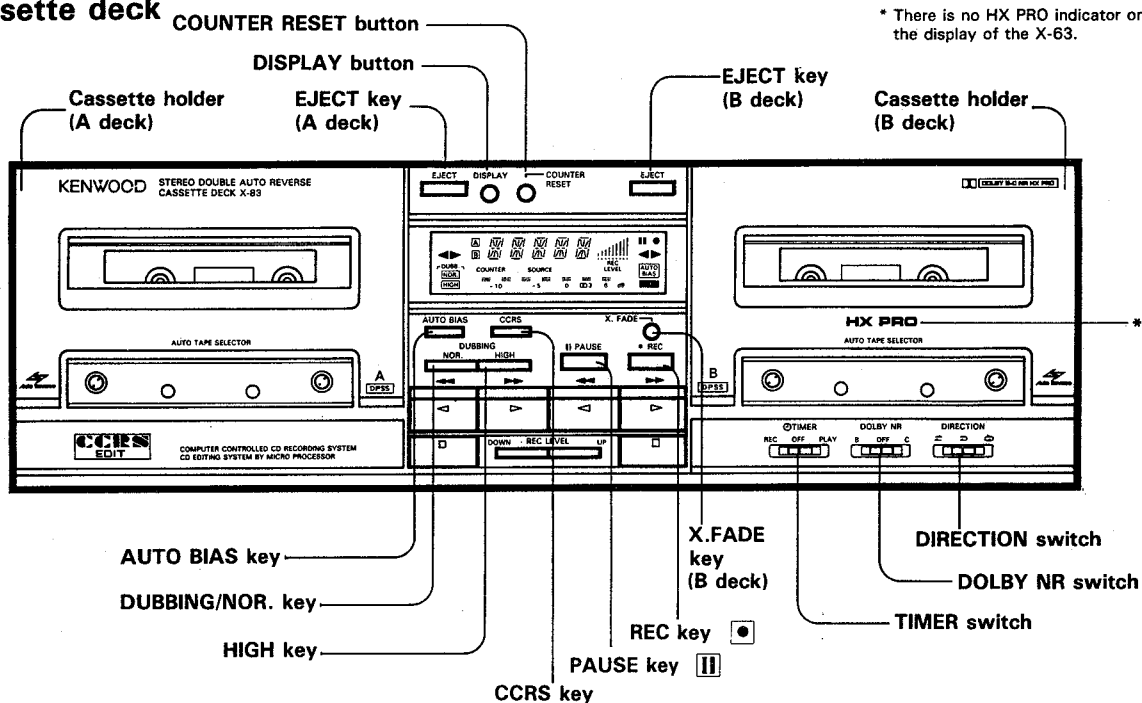
METHOD OF SUPPLYING POWER FOR REPAIR

This unit is not provided with a power supply. Perform one of the following methods:

1. Power is supplied from MIDI amplifier A-83.
2. AC voltage is applied to the AC pin on the printed circuit board. **(AC 15 V)**

CONTROLS & INDICATORS

Cassette deck



Display panel

Operation indicators (A deck)
Tape transport direction indicators (◀, ▶)

Tape counter/input source display

A, B deck indicators

REC LEVEL indicator

Operation indicators (B deck)
REC indicator (●)
PAUSE indicator (||)
Tape transport direction indicators (◀, ▶)

DUBB. indicators (NOR. HIGH)

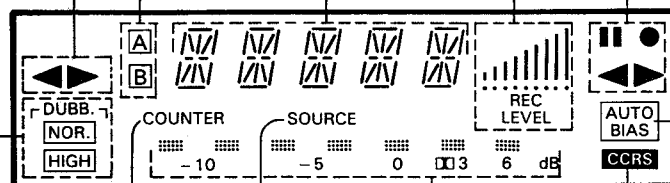
COUNTER indicator

SOURCE indicator

Peak level indicator

CCRS indicator

AUTO BIAS indicator

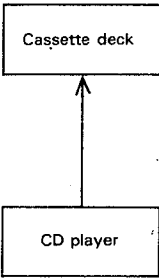


RECORDING CD SOUND (CCRS)

Recording CD sound (CCRS)

For recording CD play sound, it is recommended to use the following features which are designed to provide more effective and more convenient operations.

1. CCRS, which automatically adjusts the optimum recording level and recording bias for each CD and starts recording.
2. X.FADE, which provides fade-in and fade-out at the beginning and ending of each tune, allowing to create a continuous music tape without unnatural blanks between tunes.
3. EDIT, which, together with CCRS, enables optimum and loss-free recording by re-arranging the order of the tunes on the CD according to the recording length of the tape.



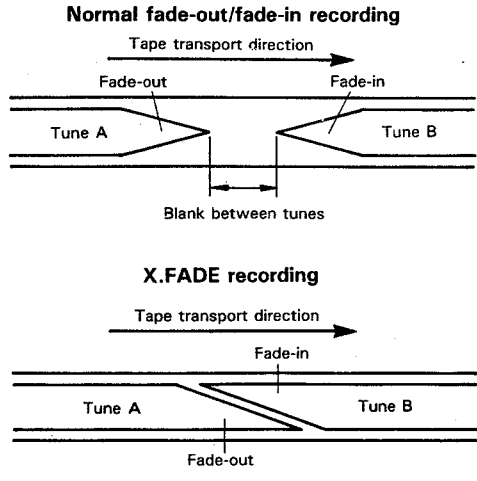
CCRS
Automatic recording level setting
Automatic bias setting
Tape-end editing

EDIT
Editing for optimum recording

■ CCRS (Computer-controlled CD Recording System)

When the CCRS key is pressed, the following operations occur automatically and CD sound is recorded on tape.

1. The CD starts to be played, and the peak value is sampled from the levels of the signals on the CD.
2. The optimum recording level for the specific CD is determined and set based on the peak value sampled.
3. The cassette deck starts the auto-bias setting.
 - The auto bias is set also with tapes which are not "normal" tapes.
4. The recording preparation steps above take about 120 seconds, after which the actual recording starts.
5. After recording (when the CD player is stopped or when the tape has run out), both the cassette deck and CD player stop.



Normal fade-out/fade-in recording

Tape transport direction →

Fade-out Fade-in

Tune A Tune B

Blank between tunes

X.FADE recording

Tape transport direction →

Fade-in

Tune A Tune B

Fade-out

■ X.FADE (cross-fade) recording

Fade-in refers to the recording starting method with which music starts at a very small volume and the volume increases gradually until the normal volume, and fade-out refers to the recording ending method with which the music volume decreases gradually until a very small volume before ending.

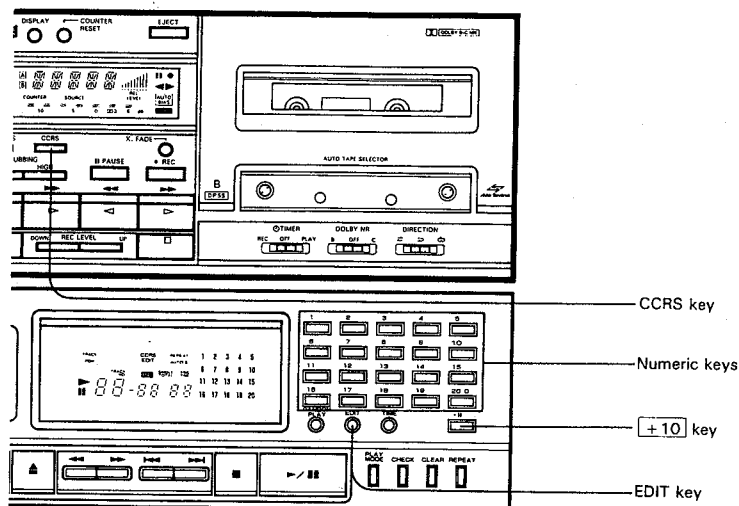
X.FADE provided for this system performs the fade-out of an ending tune simultaneously with the fade-in of the next tune, making it possible to achieve a continuous recording without blanks between tunes.

Like music played in a disco, it is possible to create a music tape in which tunes are switched while the listeners does not really notice it.

X.FADE can be initiated by just pressing a single button named the X.FADE key.

- The display of the cassette deck shows "FADE" during X.FADE recording.
- The X.FADE recording starts automatically similarly to the CCRS recording.

RECORDING CD SOUND (CCRS)

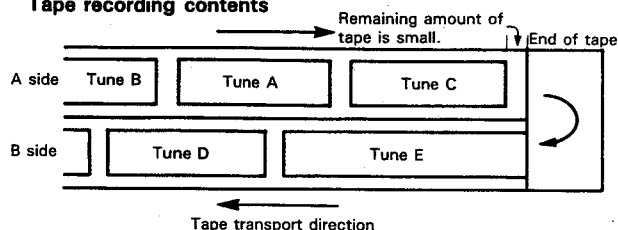


■ Recording using the Edit function of the CD player

The Edit function of the CD player rearranges the order of the tracks on a CD to match the recording length of the tape to be used. This function enables an optimally-arranged recording to be made where the music does not end abruptly in the middle of a tune at the end of the tape, and where an unnecessarily long blank section at the end of the tape is avoided. (For details, see the instruction manual provided with the CD player.)

1. Load a disc into the CD player.
2. Press the CD player's EDIT key.
3. Within 5 seconds after pressing the EDIT key, enter the total (two-side) recording time of the tape by pressing the CD player's numeric keys.
 - With the DP-730
With a C-60 tape, press the **[+10]** key six times and then press the **[0]** key once.
 - With a C-46 tape, press the **[+10]** key four times and then press the **[6]** key once.
4. Load the tape into the B deck.
 - The tape should be fully rewound to the beginning.
5. Perform the operations indicated in the "Setup of controls" procedure in the "Preparation for recording" section.
6. Press the CCRS key on the cassette deck.
 - Recording is started automatically by the CCRS function.
 - When recording is completed, both the cassette deck and the CD player stop automatically.
 - To stop recording in the middle, press the stop key **[■]**.

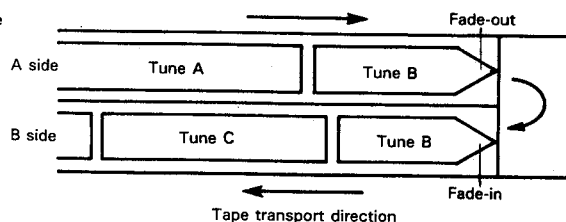
Tape recording contents



■ Fade-out/Fade-in recording

With this function, when the end of the A side of a tape is reached, the tune being recorded is faded out, and the tune is faded back in at the beginning of the B side of the tape.

1. Set the CD player play mode to track mode.
 - The TRACK indicator lights.
2. Prepare for recording on the cassette deck.
3. Press the CCRS key.
 - The tunes on the CD are recorded in the order of their track numbers.
 - When the end of the A side of the tape is reached in the middle of a tune, the tape is rewound slightly and the tune is faded out.
 - Recording then begins on the B side of the tape by fading in the same tune from where it left off at the end of the A side.

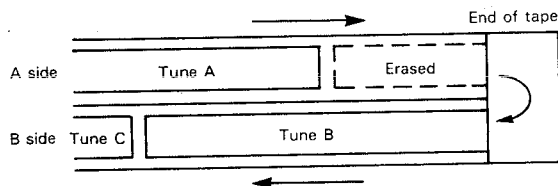


RECORDING CD SOUND (CCRS)

■ Recording from the beginning of a tune at the beginning of the reverse side

With this function, when the end of the A side of the tape is reached in the middle of a tune, that tune is erased from the A side and re-recorded from the beginning at the beginning of the B side.

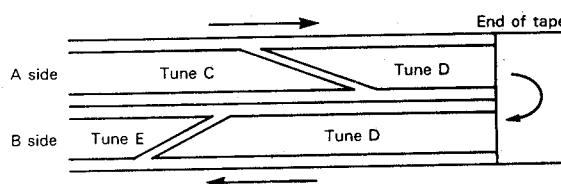
1. **Set the CD player play mode to program mode.**
 - The PROGRAM indicator lights.
2. **Program the tracks to be recorded in the desired order.**
3. **Prepare for recording on the cassette deck.**
4. **Press the CCRS key.**
 - The tunes on the CD are recorded in the programmed order.
 - When the end of the A side of the tape is reached in the middle of a tune, the tape is rewound slightly and the incomplete tune is erased.
 - The same tune is then re-recorded from the beginning at the beginning of the B side.



■ X. FADE recording

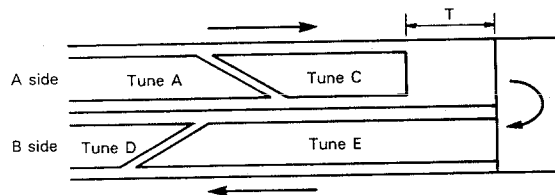
1. **Set the CD player to the desired play mode (track, program, or edit).**
2. **Press the X. FADE key.**
 - Recording begins according to the play mode selected on the CD player.
 - During recording, each transition between tunes is recorded as a fade-out/fade-in transition.
 - If the end of the A side of the tape is reached in the middle of a tune, the tune is cut off at that point and then re-recorded from the beginning at the beginning of the B side.

In track or program mode



In edit mode

The length (T) of the blank section left at the end of the tape will be longer than expected.

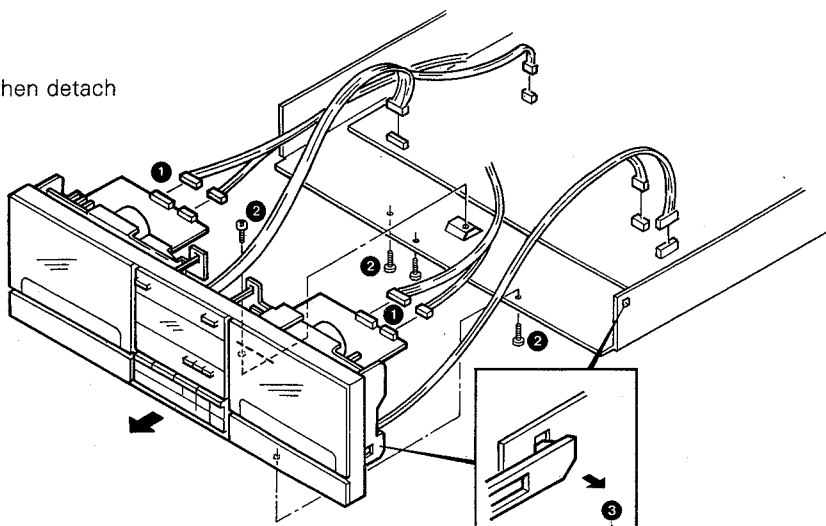


Notes:

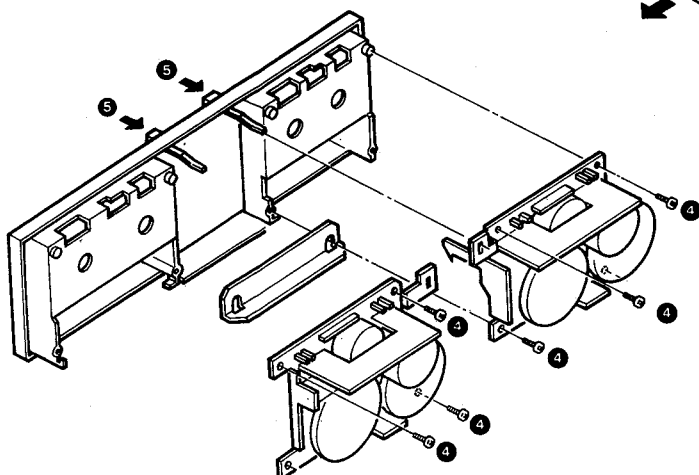
1. If the CCRS key is pressed during CD playback, playback stops and CCRS operation begins.
2. Do not press another key such as the AUTO BIAS key after pressing the CCRS key. If another key is pressed, the CCRS settings may not be carried out normally.
3. If the remaining amount of tape is small, CCRS operation may be canceled in mid-operation.
4. Once the CCRS recording level has been set, the recording level cannot be adjusted while the CCRS operation is being carried out.
5. The CCRS function sets the peak level for the entire CD in approx. 120 seconds. On very rare occasions, however, the function may not be able to set the optimum recording level. If this occurs, carry out recording manually referring to the "Syncro recording with CD" section.
6. The auto-bias setting of the cassette deck is canceled when the EJECT key of deck B is pressed.
7. The CCRS recording level setting is canceled when the OPEN/CLOSE key of the CD player is pressed or when the power is switched OFF. However, if the auto-bias of the cassette deck has already been set (if the AUTO BIAS indicator is lit) when one of these actions occurs, the set bias value will be retained.
8. With a CD such as a classical music CD which contains a tune with a very long track length, the CCRS function may not be able to be used due to the fact that the tune may not be recordable on a single side of a tape. In such a case, record the CD manually referring to the "Syncro recording with CD" section.
9. It is not recommended to use the X. FADE function when recording tunes which already contain fade-in and/or fade-out sections, as blank spaces may be recorded between tunes.
10. When the CCRS function is used to record CDs such as live music CDs which do not have definite start and stop points, blank spaces may be automatically inserted between tunes.

DISASSEMBLY FOR REPAIR

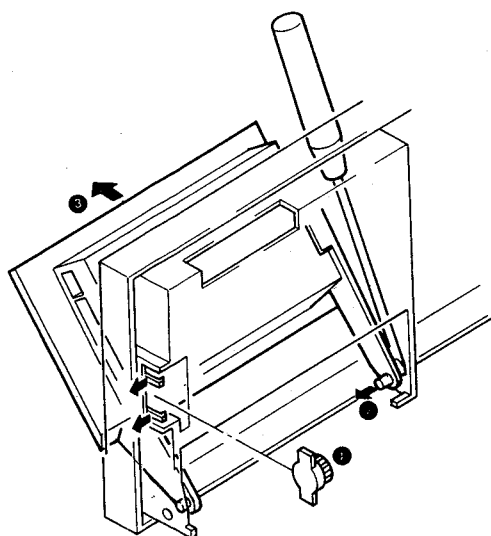
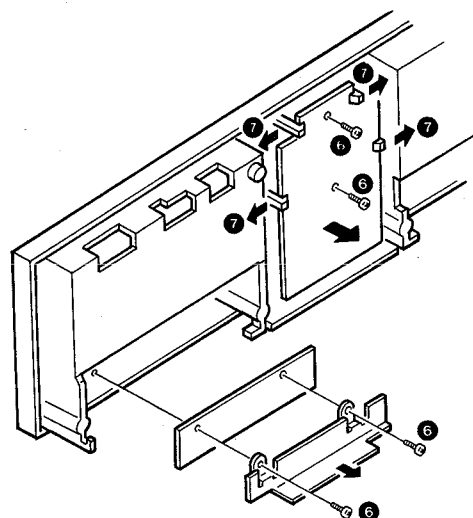
1. Disconnect the eight connectors (1).
2. Remove the four screws (2).
3. Undo the two catches (3) at the both sides, then detach the front panel.



4. Remove the eight screws (4).
5. Press the EJECT button (5), then detach the mechanism.



6. Remove the four screws (6).
7. Undo the four catches (7), then disconnect the two boards.



Removing the cassette holder

1. Open the cassette holder.
2. Bend the hook in the direction of an arrow, and detach the damper... 1
3. Insert a thin screwdriver from the front side, and detach the boss of the holder from the sub panel... 2
4. Draw off the cassette holder from the sub panel in the direction of an arrow... 3



CIRCUIT DESCRIPTION

RECORDING/PLAY AMPLIFIER UNIT (X28-2070-00)

Ref.No.	Name	Use/Function	Operation/Condition/Compatibility
IC1,2	NJM45650-D	MPX electronic volume control buffer	
IC3	TC9213P	Electronic volume control	
IC4	HA12088AUT	Dolby B/C NR SW	
IC5	CXA1115BP	Playback EQ	
IC7	BA6215	Recording EQ, tape SW	Controlled by IC8, controls IC9.
IC8	TD62554S	Recording EQ, tape SW driver	Controls IC7.
IC9	CXA1198AP	Recording EQ	
IC10	TD62554S	Auto bias control	
IC11	NJM4565D	12 V/18 V AVR	
IC12	NJM4565D	DPSS amplifier, level amplifier	
IC13	M51951ASL	Reset IC	
IC14	μ PD75112CW-031	Microprocessor (master)	
Q1,2	DTC124EN	Playback EQ, output mute	Controlled by Q18. ON only for recording, and otherwise OFF.
Q3,4	DTC124EN	Playback EQ, output SW (Deck B)	Controlled by Q21. ON for play on deck B, and OFF for play on deck A
Q5,6	DTC124EN	Playback EQ, output SW (Deck A)	Controlled by Q22. ON for play on deck A, and OFF for play on deck B.
Q7,8	DTC124EN	Playback high-frequency compensation SW (Deck A)	Controlled by pin 1 of IC14. Normally ON, and OFF only for high-speed dubbing to decrease the playback high-frequency compensation level in high-speed dubbing.
Q9,10	2SD1302	Recording mute (Deck A)	Controlled by Q24. Normally ON, and OFF only for recording.
Q11,12	2SD1302	Line mute	OFF for play, recording or recording pause, and otherwise ON. Without interchangeable transistors
Q13	DTC124EN	Auto bias test tone SW	Controlled by Q14. Normally ON, and OFF only for auto bias.
Q14	DTA124EN	Auto bias test tone inverter	Controlled by Q15. Normally ON, and OFF only for auto bias.
Q15	DTC124EN	Auto bias test tone SW	Controlled by pin 23 of IC14. Normally ON, and OFF only for auto bias.
Q16	DTC124EN	Dolby B/C inverter	Controlled by pin 26 of IC14. ON for Dolby B, OFF for Dolby C, and unfixed for Dolby NR OFF
Q17	DTC124EN	Dolby NR ON/OFF inverter	Controlled by pin 25 of IC14. ON for Dolby NR OFF, and OFF for Dolby NR OFF.
Q18	DTC124EN	Dolby NR recording/play inverter	Controlled by pin 24 of IC14. OFF only for recording, and otherwise OFF.
Q19,20	DTC124EN	Playback EQ 120 μ sec/70 μ sec inverter	Controlled by Q21 and Q22. Q19 ON for play on deck A, and Q20 ON for play on deck B.
Q21	DTC124EN	Playback EQ 120 μ sec/70 μ sec inverter	Controlled by Q22. ON for play on deck A, and OFF for play on deck B.
Q22	DTC124EN	Playback EQ 120 μ sec/70 μ sec inverter	Controlled by pin 41 of IC14. OFF for play on deck A, and ON for play on deck B.
Q23	DTC124EN	EQ speed inverter	Controlled by pin 1 of IC14. OFF for normal speed dubbing, and ON for high speed dubbing.
Q24	DTA124EN	Recording mute driver	Controlled by pin 42 of IC14. Normally ON, and OFF only for recording. Without interchangeable transistor
Q25	2SC945	Recording/play SW (Deck B)	Controlled by pin 44 of IC14. ON only for recording, and otherwise OFF.
Q26	2SD863	Bias OSC	By a tank circuit composed of L9 and C145, oscillates at 105 kHz. Without interchangeable transistor
Q27	2SA733	Bias current buffer	To drive Q28, current-amplifies the 18 V supply voltage.
Q29	2SC945	Bias current buffer	To drive Q29, the current amplified by Q28 is further amplified.

CIRCUIT DESCRIPTION

Ref.No.	Name	Use/Function	Operation/Condition/Compatibility
Q30	2SC945	Bias SW	Controlled by pin 43 of IC14. Normally ON, and OFF only for recording.
Q31	2SC945	X-fader SW	Controlled by pin 27 of IC14. ON/OFF for X-fader mode.
Q32	2SA733	Metal tape bias SW	Controlled by pin 6 (METAL HALL) of W1 of deck B. ON with metal tape to appropriately control the bias current and voltage.
Q34	2SC945	CrO ₂ tape bias SW	Controlled by pin 4 (CHROME HALL) of W1 of deck B. ON with normal tape to appropriately control the bias current and voltage.
Q35	2SD863	5 V AVR control	Converts the mechanism's 12 V power into a 5 V power. Without interchangeable transistor
Q36	2SB941	12 V AVR control	Converts into the mechanism's 12 V power the DC resultant from full-wave rectification of AC IN. Without interchangeable transistor
Q37	2SA733	12 V AVR operation amplifier output buffer	Current-amplifier the output of IC11 to drive Q36.
Q38	2SD1266	18 V AVR control	Converts into the signal system's 18 V power the DC resultant from voltage doubling rectification of AC IN. Without interchangeable transistor
Q39	2SB764	FL tube 30 V AVR control	Converts into the FL tube's 30 V power the DC resultant from voltage tripling rectification of AC IN. Without interchangeable transistor
Q40	DTC124EN	Auto bias test tone SW	Controlled by pin 12 of IC14. Normally ON, and OFF only when 10 kHz test tone is emitted.
Q41	DTC124EN	DPSS sensitivity SW	Controlled by pin 37 of IC14. ON for play, recording or recording pause, and otherwise OFF.
Q42	2SA733	Level amplifier output slice	Slices the level amplifier output not to exceed the supply voltage of the microprocessor. More, slight compression with high level input, and ON when slicing.
Q43	2SC945	Level amplifier VU SW	Controlled by pin 12 of IC14. ON except for CCRS auto bias, to let the level amplifier work as a VU amplifier.
Q45	DTC124EN	Auto bias inverter	Controlled by pin 23 of IC14. OFF only for auto bias, and otherwise ON.
Q46	2SC945	Microprocessor reset driver	ON momentarily at power ON to accept the microprocessor reset.
Q47	DTA124EN	Line mute driver	Controlled by pin 37 of IC14, controls Q11 and Q12. OFF for play, recording or recording pause, and otherwise ON.
Q48,49	2SC3246	Solenoid driver	Controlled by pins 55 and 62 of IC14. ON for play or recording, and otherwise OFF to raise the head.
Q50,51	DTC124EN	Capstan motor speed driver	Controlled by pins 56 and 63 of IC14. OFF only for high speed dubbing, and otherwise ON.

CIRCUIT DESCRIPTION

RECORD AMP UNIT (X87-1190-05)

Ref.No.	Name	Use/Function	Operation/Condition/Compatibility
IC1,2	BA6251F	EQ SW	The equalizer elements are switched ON and OFF by controlling IC1(2) pins 1 to 7 to which CN1 pins 6 and 7 and CN2 pins 1 to 4 are connected. When all input terminals go "High" level, the output terminals (pins 10 to 16 on each IC) is connected to GND (pin 8) so that the NF constant of IC3 is determined.
IC3	M5218P-A	REC EQ POWER AMP	Single-power operation amplifier which is used by increasing the input voltage to 1/2 V _H . The recording equalizer characteristic is obtained by determining the NF constant using IC1 and IC2.
Q1,2	2SC2713	SIGNAL MUTE	When CN2 pin 5 goes "High" level, Q1 and Q2 go ON, and the signals input via CN1 pin 1 and CN2 pin 9 are muted.

DISPLAY UNIT (X25-3700-00)

Ref.No.	Name	Use/Function	Operation/Condition/Compatibility
IC1	μ PD7537ACU-214	Microprocessor (slave)	

CIRCUIT DESCRIPTION

MICROPROCESSOR OPERATION SPECIFICATION

1. FUNCTION OUTLINE

1-1 Used microprocessor

① μ PD75112CW-031

A control master microprocessor, which controls over the cassette mechanism, the recording/playback circuit, the electronic VR unit (TC9213P) and the slave microprocessor (μ PD7537ACU-214).

② **Slave microprocessor (μ PD7537ACU-214)**

Used for control of key input and FL display tube.

1-2 Functions

① Either deck A or deck B performs each operation of forward play (FWD PLAY), reverse play (RVS PLAY), fast forwarding (FF), rewinding (REW), recording (REC), recording pause (REC PAUSE), play pause (PLAY PAUSE), and stop (STOP) by their corresponding seven keys.

② **Dubbing**

The normal dubbing or high-speed dubbing from deck A to deck B is feasible by use of the DUBBING key or HI-DUBBING key.

③ **DPSS mode**

Each operation of skip music scan, one-tune repeat, dash & play, full repeat, rewind play, re-recording standby, and auto recording mute is performed by the double pressure of its corresponding key or by a key operation during the operation mode.

④ **Timer operation**

Timer recording or timer play is feasible by timer switch setting.

⑤ **Auto bias**

The 400 Hz and 10 kHz recording/play levels are detected to set the optimum bias of that tape. (NOR. CrO₂ TAPE)

⑥ **CCRS**

By combined use with A-83, and DP-730, recording is automatically feasible at an optimum level and an optimum bias from a CD player.

⑦ **Serial communications**

By combined use with a system provided with a serial communication bus, synchronous recording is feasible with a CD player or turntable through full remote control and two-way image operation.

⑧ **Backup**

Recording VR levels are backed up by running directions of deck and recording sources.

a) As to the running direction of a deck, that in final play or recording is backed up.

b) Recording VR levels are backed up by recording sources. When the recording VR key is pressed, when the recording VR level is changed, the recording VR data of the then selected source is newly written appropriately.

As to the recording source, the source then entered to the amplifier's selector memory of the deck is selected. Thus, at power ON, the tuner is selected as the recording source. After that, that selected by the amplifier's selector is engaged as the recording source.

When the amplifier's selector is set to TAPE A or TAPE B, the rewriting and backup of the recording VR level data is not accepted.

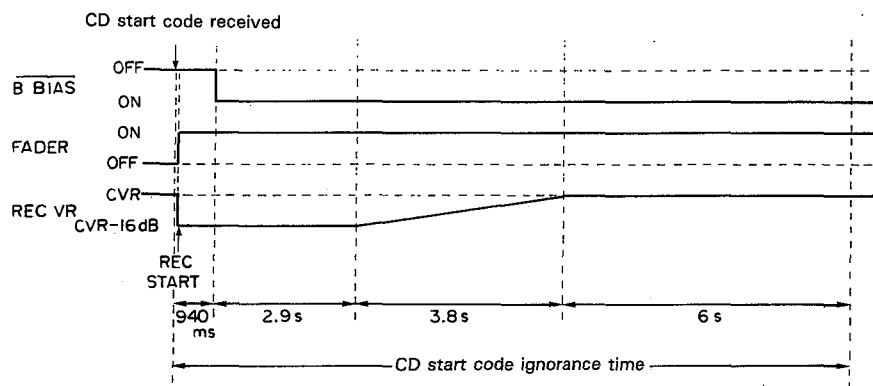
⑨ **MPX auto ON/OFF**

When the amplifier's selector memory of the deck refers to the tuner, the MPX ON/OFF pin (pin 35) turns ON in the recording mode. In the normal operation or in the recording mode, when the selector is set to other than the tuner, this pin turns OFF.

⑩ **X. FADE**

The timing chart for between B BIAS (pin 43), FADER (pin 27) and the recording VR level is as follows (See next page):

CIRCUIT DESCRIPTION



2. KEY FUNCTIONS

2-1 Key matrix

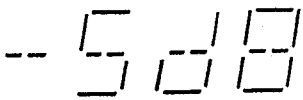
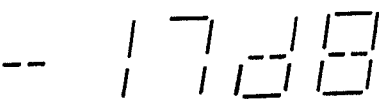
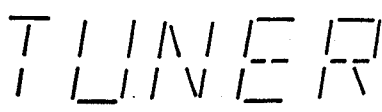
Slave microprocessor (μ PD7357ACU214): Subject to control by each switch on the front panel.

Return Scan	KR1	KR2	KR3	KR4	NC
1G (KS1)		DOLBY C			
2G (KS2)		DOLBY B	T.REC	T.PLAY	TIMER OFF
3G (KS3)	B FF ⏮	B FWD ⏭	B REC ⏮/⏭	B STOP □	
4G (KS4)	B RWD ⏮	B RUS ⏮	B PAUSE ⏮	X.FADE	
5G (KS5)	DISPLAY	C.RESET		VR UP	
6G (KS6)	CCRS	AUTO BIAS	HI-DUBB	NOR DUBB	
7G (KS7)	A FF ⏮	A FWD ⏭	A STOP □	VR DOWN	
8G (KS8)	A RWD ⏮	A RUS ⏮			

Master microprocessor (μ PD75112CW-031): Subject to control by each switch information from the cassette mechanism.

Return Scan	KR1	KR2	KR3	KR4
KS1			HALF (A)	
KS2		RVS REC (B)	HALF (B)	FWD REC (B)
KS3	TEST 1	TEST 2	W/S REC	

CIRCUIT DESCRIPTION

Key Name	Function	Display
FWD PLAY  (Common for A and B)	Provided that a cassette is present, this key activates playback in FWD direction. Pressing the key during FWD playback activates 1-program repeat. This key is inhibited while the other deck is in the REC or REC PAUSE mode.	Counter of the deck of which the key is pressed.
RVS PLAY  (Common for A and B)	Provided that a cassette is present, this key activates playback in RVS direction. Pressing the key during RVS playback activates 1-program repeat. This key is inhibited while the other deck is in the REC or REC PAUSE mode.	Counter of the deck of which the key is pressed.
FF  (Common for A and B)	Winds tape to the right reel. Pressing the key during playback activates skip search. Pressing the key during RVS recording activates Re-Rec Standby.	Counter of the deck of which the key is pressed.
REW  (Common for A and B)	Winds tape high speed to the left reel. Pressing the key during playback activates skip search. Pressing the key during FWD recording activates Re-Rec Standby.	Counter of the deck of which the key is pressed.
STOP  (Common for A and B)	Interrupts any operation and stops tape.	
REC/ARM  (B only)	Starts recording in the current head direction. Pressing the key during recording activates ARM.	Counter of the deck of which the key is pressed. The REC indicator (●) lights up. It blinks during ARM, and lights steadily after its end (■■●).
PAUSE  (B only)	Changes the mode from REC to REC PAUSE, or from PLAY to PLAY PAUSE.	The PAUSE indicator lights (■■).
REC LEVEL UP	Increments the recording level from $-\infty$ to 0 in 1 dB steps. Holding the key for more than 0.35 second increases the level in 0.12 second intervals.	ex) The previous display resumes 5 seconds after the key is released. 
REC LEVEL DOWN	Decrements the recording level from 0 to $-\infty$ in 1 dB steps. Holding the key for more than 0.35 second decreases the level in 0.12 second intervals.	ex) 
AUTO BIAS (B only)	Activates auto-bias adjustment provided that a recordable cassette is inserted.	The lighting REC indicator goes off, the AUTO BIAS indicator blinks, and it lights steadily after completion of setting.
CCRS (B only)	In interlocked operation with the CD player, adjusts the CD recording level automatically.	The CCRS indicator blinks at high speed. It blinks at low speed during edit recording after completion of setting.
NOR SPEED DUBBING	Starts normal speed dubbing from A→B. Pressing the key during normal dubbing activates ARM on Deck B, and pressing the key again resumes normal dubbing.	The DUBB, NOR and (B)REC (●) indicators light. During ARM, only the (B)REC indicator blinks.
HIGH SPEED DUBBING	Starts high-speed dubbing from A→B. Pressing the key during high-speed dubbing activates ARM on Deck B.	The DUBB, HIGH and (B)REC (●) indicators light. During ARM, only the (B)REC indicator blinks.
DISPLAY	Switches the content of the FL counter display as follows: A counter → B counter → REC SOURCE Pressing the key during REC LEVEL display resumes the previous display.	 SOURCE (TAPE A during dubbing)

CIRCUIT DESCRIPTION

Key Name	Function	Display
C RESET	Pressing the key during counter display resets the counter to 0000.	
DIRECTION SW	Selects one of the following operations to be executed at the time of auto-stop detection. ... One-way ... Reverse ... Endless	
TIMER START SW	Sets the operation mode to be performed at Power ON. PLAY ... Playback, provided that a cassette is inserted (priority on Deck A). OFF ... Not started. REC ... Recording, provided that a cassette is inserted (priority on Deck A).	
DOLBY SW	Sets the Dolby NR mode. B. Dolby ON, B type. OFF ... Dolby OFF. C. Dolby ON, C type.	
CASSETTE DETECT SW	Turns ON when a cassette shell is present. While this switch is OFF, the keys of the deck and the DUBBING key are inhibited. In case of Deck B, the AUTO BIAS and CCRS keys are also inhibited.	ex) Display when cassette is not present in Deck A
FWD REC PERMIT SW	Turns ON when recording permission tab for FWD direction is present. Recording in the FWD direction is inhibited while this SW is OFF.	
RVS REC PERMIT SW	Turns ON when recording permission tab for RVS direction is present. Recording in the RVS direction is inhibited while this SW is OFF.	

Function	Key names	Description
REWIND PLAY	◀◀ + ▶ or ▶▶ + ◀	Tape rewinds until the end, the first program is searched, and playback is started as soon as it is detected.
DASH & PLAY	◀◀ + ▶▶	When a portion without recorded program has lasted for more than 10 seconds during playback, cueing is started, and playback resumes from the position where the beginning of the next program is detected. The full-repeat function can be used according to the Reverse Mode SW setting. One-side full repeat × 8 times Two-side full repeat × 8 times (16 sides) Two-side relay repeat × 29 to 31 sides in total on A and B. If cassette is not present in one deck, playback ends at the RVS end (i.e. after 1 or 2 times).
ZERO STOP	◀◀ + ■ or ▶▶ + ■	Tape is rewound or fast forwarded until the counter reading of 0000, where it is stopped. However, when the zero-stop operation of a deck has been activated, the simultaneous zero-stop operation of the other deck can be started by switching the counter display for the other deck and pressing the keys for the deck.

CIRCUIT DESCRIPTION

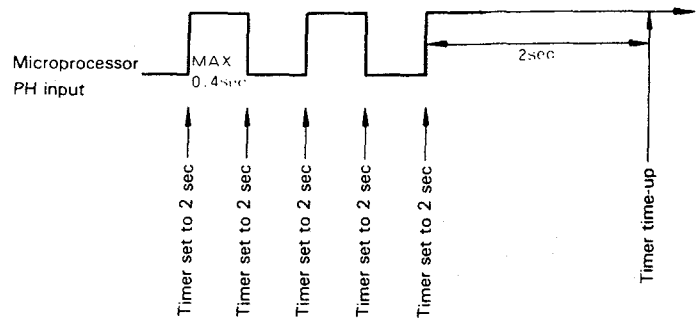
3 FUNCTION DETAILS

3-1 Auto stop

In a tape travel status other than STOP, REC PAUSE and PLAY PAUSE, when the signal from the photo-reflector attached to the mechanism reel stand keeps "H" or "L" for more than 2 sec the tape stops or the head is reversed.

As shown above, each time that the output of the photo-reflector attached to the rear side of the reel stand is reversed, the software timer of which the set time is 2 sec is started. When the reel stand is rotating, that is when the output of the photo-reflector is reversed within 2 sec, the timer is successively updated so that the timer does not stop.

When the output of the photo-reflector keeps a fixed value for more than 2 sec the timer operates. Then, this operation is detected and the auto stop process is performed.



3-2 Timer Function

When the power is turned ON with the timer switch set to PLAY or REC position, the designated operation starts after the initial delay period (approx. 4 seconds).

In timer recording mode, approx. 1.5 seconds after the power is turned ON, the "TUNER PLAY" 28 H signal is output to set the input selector of the amplifier to TUNER.

Timer operation sequence table

Condition				TIMER SW		
Cassette in deck A	Cassette in deck B	Safety tab of cassette A	Safety tab of cassette B	T. PLAY	T. REC [= or ⇐]	T. REC [⇐]
×	×	/	/	/	/	/
○	×	○	/	A. PLAY	/	/
○	×	×	/	A. PLAY	/	/
×	○	/	○	B. PLAY	B. REC	B. REC
×	○	/	×	B. PLAY	/	/
○	○	○	○	A. PLAY	B. REC	B. REC
○	○	○	×	A. PLAY	/	/
○	○	×	○	A. PLAY	B. REC	B. REC
○	○	×	×	A. PLAY	/	/

○: Available ×: Not available /: Not concerned

3-3 Relay play

(1) With the reverse mode switch set to ⇐ or ⇐ and cassettes loaded in both decks, when the deck in play reaches the tape end, the other deck starts play.

i) ⇐: When the deck in play reaches the end of that side of the tape, this deck rewinds the tape. In this connection, when the other deck is in stop, the playback in the head direction displayed at present is entered.

ii) ⇐: When the deck in play reaches the end of the reverse (rear) side of the tape, this deck stops. In this connection, when the other deck is in stop, the forward play (FWD PLAY) is entered.

CIRCUIT DESCRIPTION

3. OTHER FUNCTIONS

3-1 Synchronous recording (CD player and cassette deck, or turntable and cassette deck)

The deck can know the current recording source by analyzing the selector code from the amplifier at any time. In addition, after the recording mode is entered, the recording source does not change because of the preceding item (2).

By virtue of these two principles, the deck can obtain synchronization by analyzing the code from the device from which recording is made at present.

(a) Synchronous operation between CD player and cassette deck

CD operation Deck status	Stop→play	Pause→play	Play→pause	Play→stop	Pause→stop	Play→tray open	Pause→tray open
Recording (in tape run)	Non change	Non change	ARM is entered. 4 seconds later, the recording pause mode is entered.	ARM is entered. 4 seconds later the tape stops.	←	←	←
ARM (auto recording mute)	ARM is stopped, and recording is made.	←	After the termination of the current ARM time, the recording pause mode is entered.	After the termination of the current ARM time, the stop mode is entered.	←	←	←
Recording pause	The recording mode is entered.	←	Non change	The stop mode is entered.	←	←	←

(b) Synchronous operation between turntable and cassette deck

Deck status Turntable operation	Arm up→down (mute ON→OFF)	Arm down→up (mute OFF→ON)	Arm return to rest
Recording (in tape run)	Non change	ARM is entered. After the termination of ARM time (4 seconds later), the recording pause mode is entered.	ARM is entered. After the termination of ARM time (4 seconds later), the stop mode is entered.
ARM (auto recording mute)	ARM is stopped. The recording mode is restored.	After the termination of the current ARM time, the recording pause mode is entered.	After the termination of the current ARM time, the stop mode is entered.
Recording pause	The recording mode is entered.	Non change	The stop mode is entered.

Note: In case of (a), the muting is canceled after the CD player plays or it delays 2.2 seconds after output of start code. The aiming is that even when the deck

is in operation transit at start of the CD player, the head section of the recording is protected from being muted.

CIRCUIT DESCRIPTION

3-2 CCRS edit PRO (deck B exclusive feature)

Synchronous recording operations are performed by combined use of a CD player, an amplifier and the deck.

(1) Normal recording

The CD player is entered to the play mode and the deck, to the recording mode. Thus, the deck operates in synchronization with the operation of the CD player.

The following operation is also feasible due to the process prior to recording.

- When CCRS is already set (CCRS indicator in lighting)
Of the deck, the recording level is set to the preset value, on which recording is then made. During recording, the recording level cannot be varied.

(2) CCRS edit PRO

To MIDI M-93, a cross fade recording feature is added besides fade out, erase and edit features.

(A) Fade out mode

Setting: Set the CD player to the track mode, and press the CCRS key of the deck

- Operation:
- The deck issues the CCRS start code.
 - When the CD player receives the CCRS start code, the CD player issues the CD standby code and enters the sampling operation to set the recording level.

(a) Play is made for 15 seconds from the location of a length of 1 minutes prior to the end of tune Nos 1-3, or the end section of the final tune is played for 15 seconds.

- When the amplifier receives the CD standby code, its input selector is locked to the CD position to turn ON the $-\infty$ muting. When the deck receives the CD standby code, its electronic VR is set to " -6 dB" and at the same time the recording pause mode is entered to start the level detection.

(b) A-D conversion is made. The data to attenuate by the amount by which the set value is exceeded is sent to the electronic VR. This process is repeatedly performed until the CD standby code is received again.

- The CD player, after the termination of 15-second playback of the final tune, issues the CD standby code again to enter the process of a.
- When the deck receives the CD standby code of the second time, it terminates the level setting to perform the auto bias setting. After the completion of the auto bias setting, the deck enters the recording pause mode and at the same time issues the deck standby code.

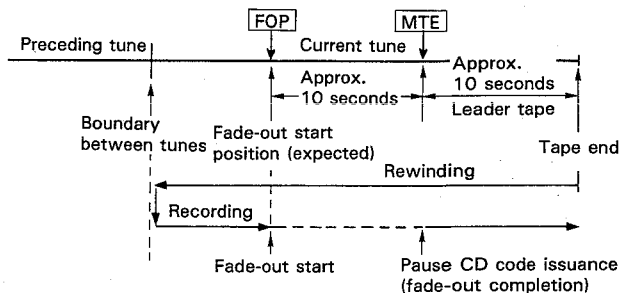
Level setting. CCRS indicator flickers at intervals of 0.25 second.

- When the amplifier receives the deck standby code, the muting is turned OFF.
When the CD player receives the deck standby code, it stops sampling to issue the CD start code. After 2.2 seconds, the CD player starts to play the tune of the smallest tune number.
- When the deck receives the CD start code, it enters the recording mode.
- The CD player issues the CD start code each time the tune number changes.
- When the deck receives the CD start code, it memorizes the then count value.
- When the deck detects the tape end, it operates depending upon the location of the boundary between the current tune and the preceding tune as follows:

1) When the boundary is located more than 20 seconds prior to the tape end...

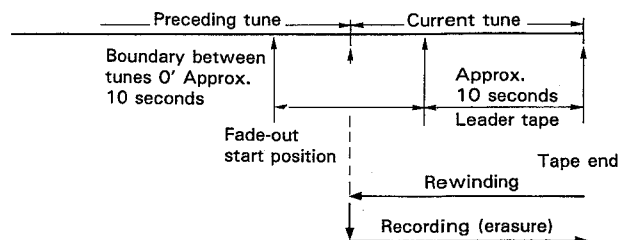
The tape end code is issued and the tape is rewound to that location. Then, the recording mode is re-entered and the play CD code is issued.

When the location prior 20 seconds to the tape end is arrived at, the fade-out operation is started. Thus, when the electronic VR setting goes to $-\infty$, the pause CD code is issued.



2) When the boundary between tunes is located between the fade-out start position and the leader tape...

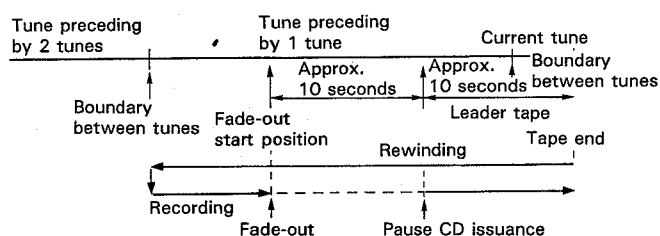
The tape end code is issued and the tape is rewound to that location. Then, the recording mode is entered, and erasure is made up to the tape end with recording mute ON.



CIRCUIT DESCRIPTION

- 3) When the boundary between tunes is located in the leader tape section (except for the first tune)...

The tape end back code is issued, and the tape is rewound to the boundary between the tune preceding by two tunes and the tune just preceding by one tune. Then, the recording mode is entered, and the play CD code is issued. When the location prior 20 seconds to the tape end is arrived at, the fade-out operation starts. Thus, when the electronic VR setting goes to $-\infty$, the pause CD code is issued.



- 4) When the start position of the first tune is located in the leader tape section...

The tape end code is issued, and the subsequent reverse operation is performed as it stands.

- When the tape end is reached again after erasure or fade-out operation at previous item 1), 2) or 3), or when previous step 4) is at work, a following operation is performed.

① When reverse recording or "≡" mode is engaged, or when the reverse side of the tape is disabled from recording...

The stop mode is entered to issue the deck stop code. The CCRS mode is canceled.

② Other than above item 1)

The reverse recording mode is entered. After ARM is thus applied for 10 seconds, the play CD code is issued to start the fade-in operation from $-\infty$.

B) Erase mode

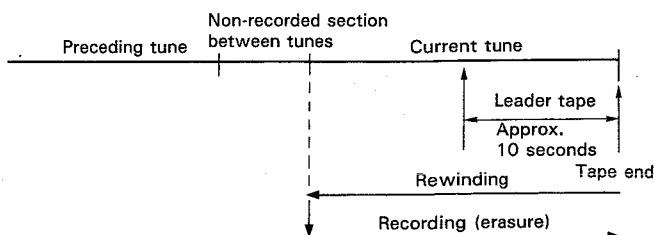
Setting: Set the CD player to the PGM mode, and after tune programming, press the CCRS key of the deck.

Operation: • The level setting is the same as in "(a) Fade out mode".

- When the CD player receives the deck standby code, it searches for the first programmed tune to issue the CD start code. After 2.2 seconds, play of that tune is started.
- When the deck receives the CD start code, it enters the recording mode.
- When the tune ends, the CD player issues the CD end code, and when the next tune starts, the CD player issues the CD start code.
- When the deck receives the CD end code and start code, it memorizes the then count values.
- When the deck detects the tape end, it performs depending upon the location of the boundary between tunes as follows:

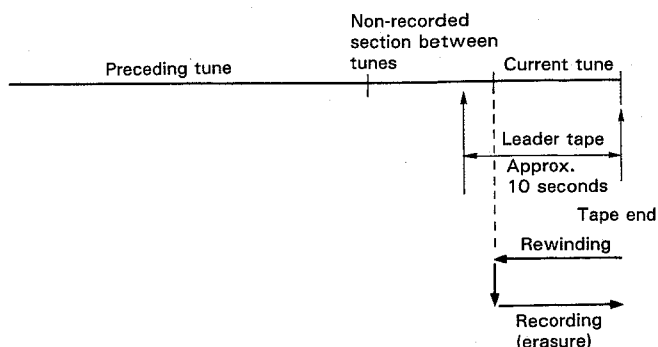
- 1) When play is made at present and the start position of that tune is prior to the leader tape section...

The tape end code is issued, and the tape is rewound to the start position of that tune. Then, the recording mode is entered with recording mute kept ON (in which erasure is made).



- 2) When play is made at present, the start position of that tune is located in the leader tape section and the end position of the preceding tune is prior to the leader tape section...

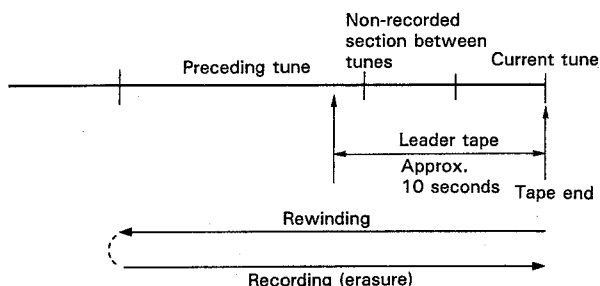
The operation is the same as above 1).



CIRCUIT DESCRIPTION

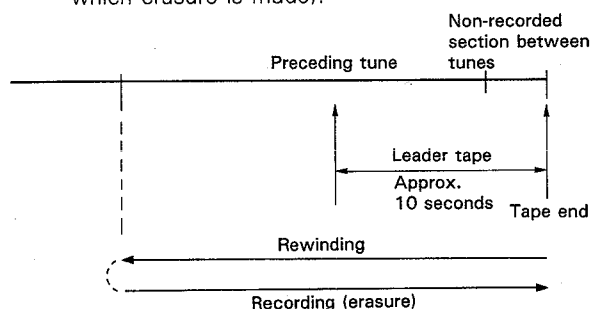
- 3) When play is made at present, the start position of that tune is located in the leader tape section and the end position of the preceding tune is also located in the leader tape section...

The tape end back code is issued, and the tape is re-wound to the start position of the preceding tune. Then, the recording mode is entered with recording mute kept ON (in which erasure is made).



- 4) When a non-recorded section between tunes is engaged at present and the end position of the preceding tune is in the leader tape section...

The tape end code is issued, and the tape is re-wound to the start position of the preceding tune. The recording mode is entered with recording mute kept ON (in which erasure is made).



- 5) When a non-recorded section between tunes is engaged at present and the end position of the preceding tune is prior to the leader tape section...

The pause CD code is issued, and the subsequent reverse operation is performed.

- When the tape end is reached again after erasure at previous item 1), 2), 3) or 4), or when previous step 5) is at work, a following operation is performed.

- 1) When reverse recording or "≡" mode is engaged, or when the reverse side of tape is disabled from recording...

The stop mode is entered to issue the deck stop code. The CCRS mode is canceled.

- 2) Other than above 1)

The reverse recording move is entered. After ARM is thus applied for 10 seconds, the play CD code is issued.

(C) Edit mode

Setting: Press the EDIT key of the CD player, enter the tape length, then make edition, after which press the CCRS key of the deck.

Operation: ● The level setting is the same as in "(A) Fade out mode".

- The operation during play is the same as in "(B) Erase mode". However, the CD player, upon the termination of all tunes on the A side, issues the A side end code, and enters the pause mode at the head tune on the B side.

- The operation at the tape end of the deck is the same as in "(B) Erase mode". However, when the tape length is suited, item 5) of "(B) Erase mode" is engaged.

When the status other than at the same item 5) is entered due to faulty input, etc., that is when the tape end or tape end back code is received, the CD player cancels the edit mode, after which it performs the operation occurring at "(B) Erase mode".

(D) Cross fade mode

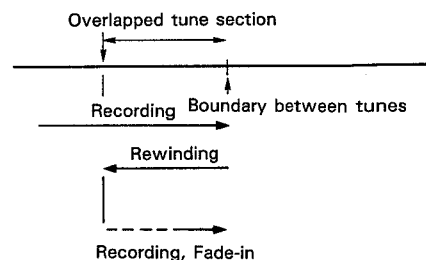
Setting: The setting of the CD player is the same as in previous article (A)-(C). Then, press the CROSS FADE key of the deck.

Operation: ● The level setting is the same as in previous article (A)-(C).

- Operation during recording:

- 1) When the CD player is in the track mode...

When the deck receives the CD start code, it issues the tape end code to rewind the tape to the location prior 10 seconds. Then, the play CD code is issued, and the recording pause mode is entered at electronic VR setting of $-\infty$. Upon reception of the CD start code, the recording mode is entered at a low bias.



CIRCUIT DESCRIPTION

2) When the CD player is in the PGM mode...

When the deck receives the CD end code, it issues the pause CD code to rewind the tape to the location prior 10 seconds.

The rest operation is the same as in previous item 1).

When it receives the A side end code, it clears the in-tune flag, memorizes the counter value and continues the recording as it is.

● Operation when tape end is detected:

1) When reverse recording or " $\rightleftharpoons$ " mode is engaged, or when the reverse side of the tape is disabled from recording during the forward recording mode...

The stop mode is entered to issue the deck stop code. The CCRS mode is canceled.

2) Other than above item 1)

a) Even in a tune or without tune, when the tune end reaches the leader tape section...

the deck end code is issued.

b) Without tune, when the tune end does not reach the leader tape section...

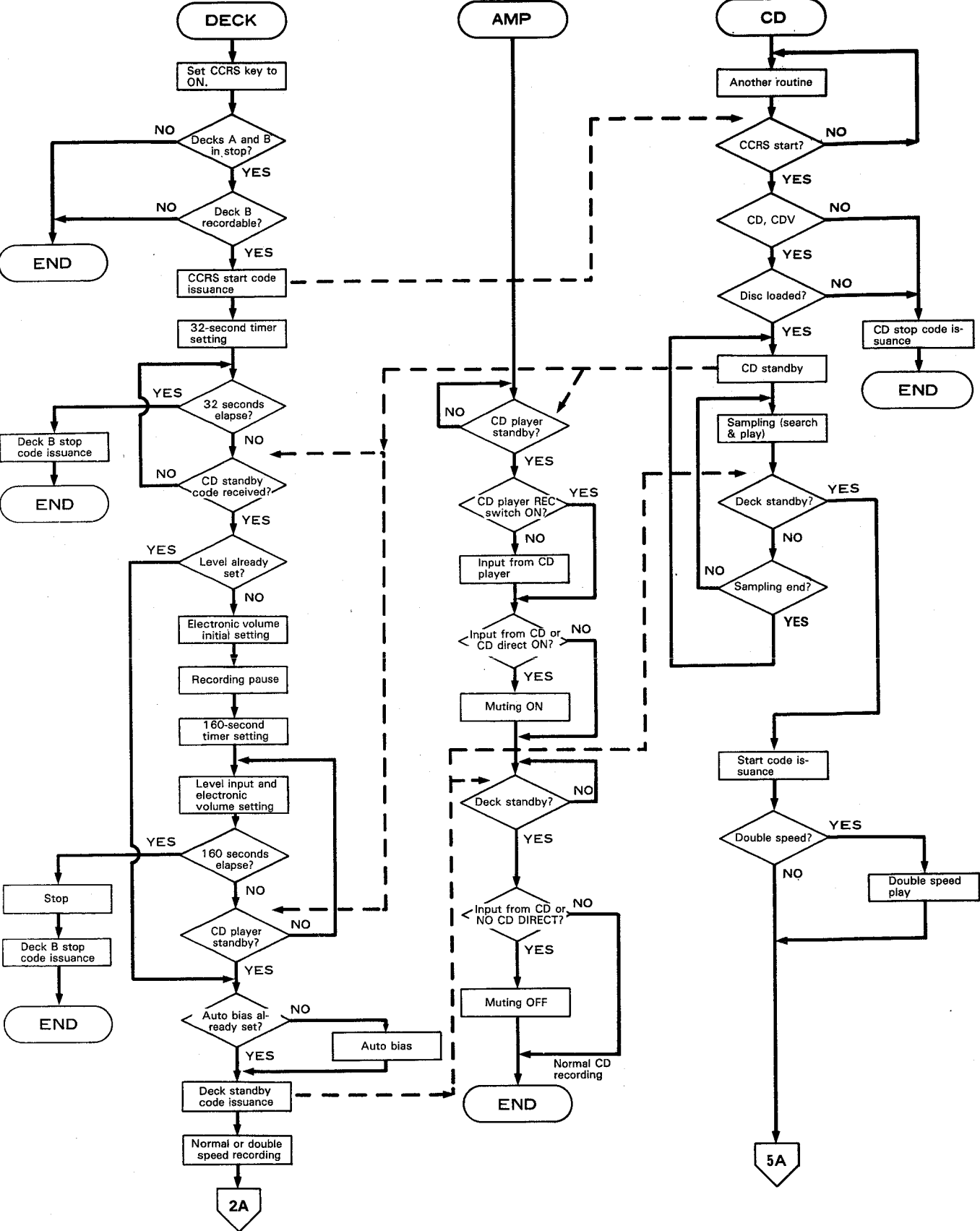
the pause CD code is issued.

The reverse recording mode is entered. After ARM is thus applied for 10 seconds, the play CD code is issued. The, the recording mute is OFF.

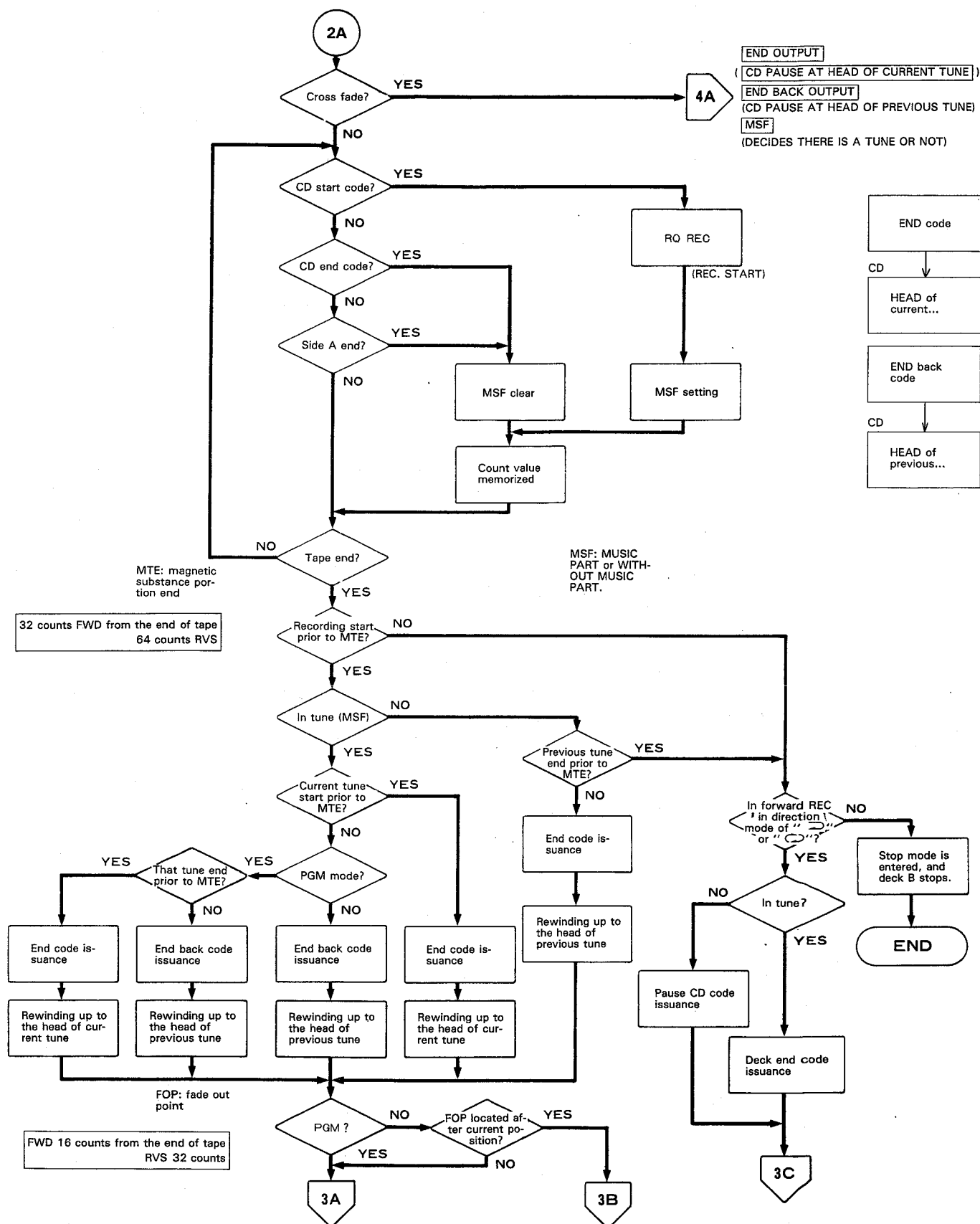
CIRCUIT DESCRIPTION

4. CCRS EDIT PRO OPERATION FLOWCHART

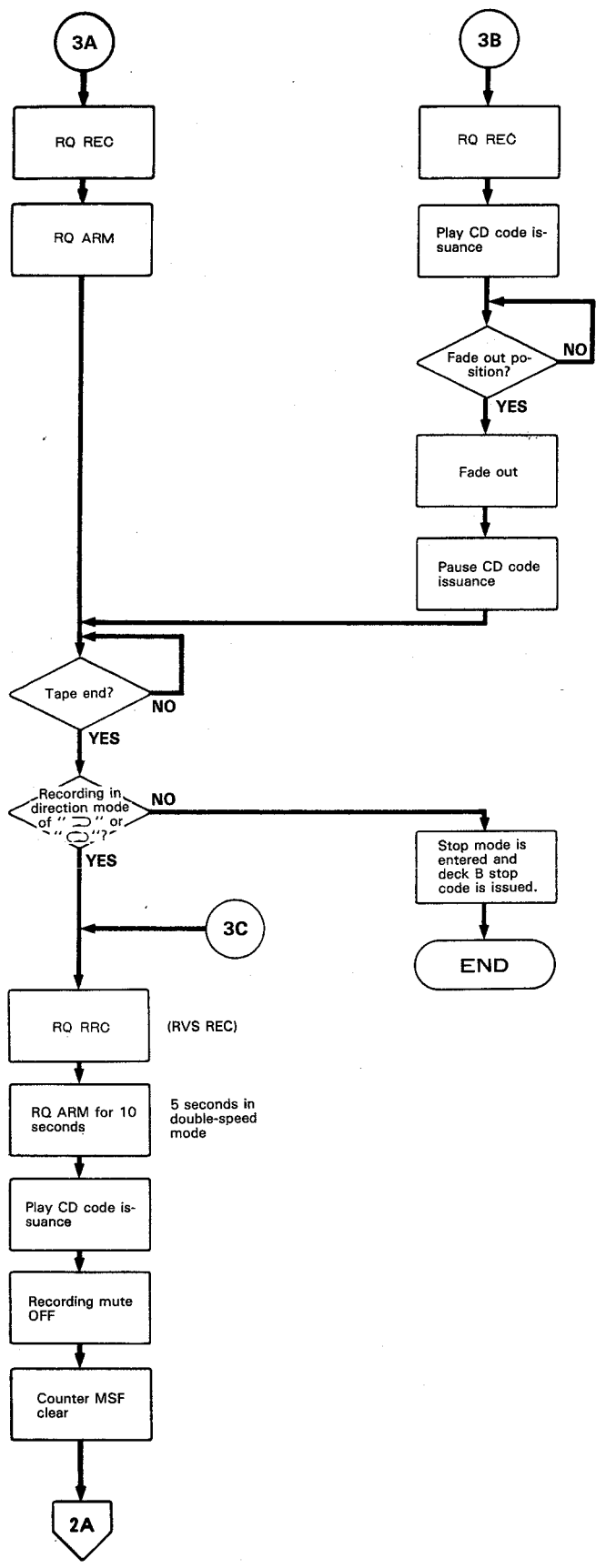
(1) Recording level setting



CIRCUIT DESCRIPTION

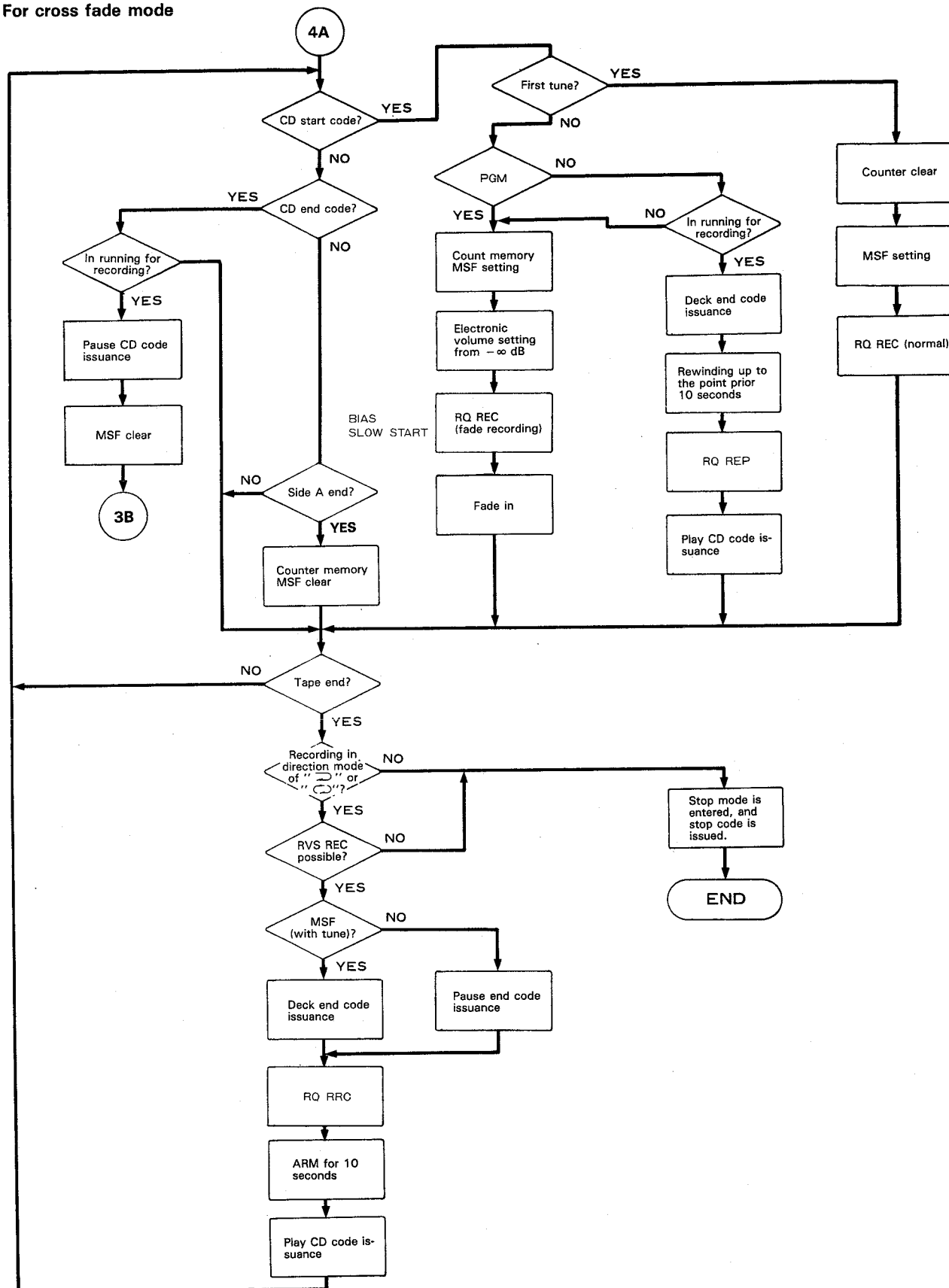


CIRCUIT DESCRIPTION



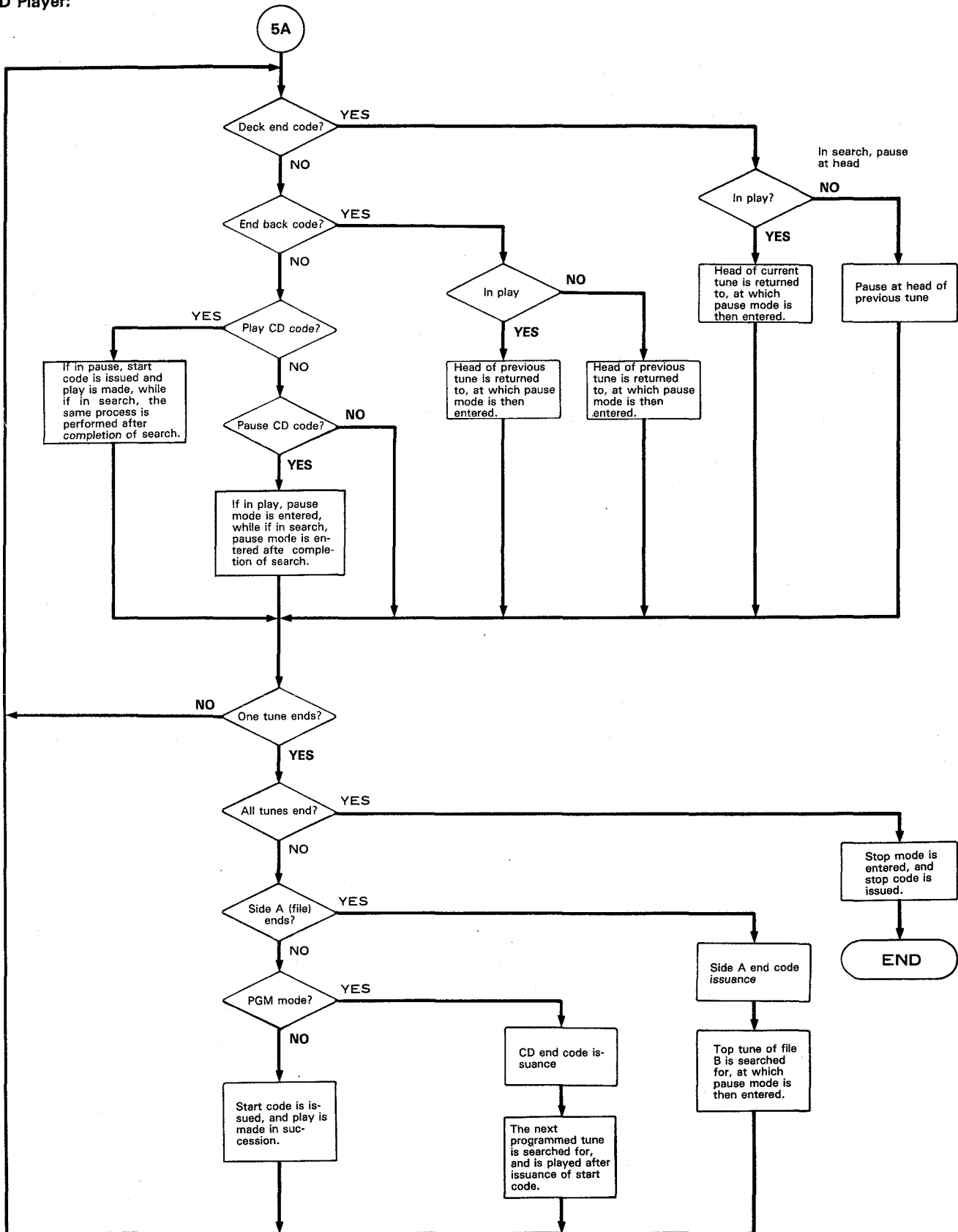
CIRCUIT DESCRIPTION

For cross fade mode



CIRCUIT DESCRIPTION

LD Player:



CIRCUIT DESCRIPTION

5. TEST MODE

5-1 TEST1

(1) Setting method

Short KS3 (pin 20) and KR1 (pin 1) by a diode and set the timer switch. After that, when the power is turned ON, the TEST1 mode is entered. Once the TEST1 mode is entered, even when the diode is disconnected off, the TEST1 mode is not canceled.

The auto bias test is feasible as long as they are shorted by the diode. However, otherwise, for each other test, the power must be turned ON with them shorted by the diode prior to power ON.

(2) Canceling method

Press the pause key of deck A or deck B.

(3) Operation specification

a) Display all lit

At power ON, the display is all lit for about 1.5 seconds.

b) Play operation test (timer switch play)

Set the timer switch to the play mode, and turn the power ON, and about 4 seconds later deck A will start forward play at a normal speed, in which it turns it performs forward play at a normal speed for 5 seconds, at a high speed for 1.5 seconds, then reverse play at a normal speed for 2 seconds, and stops. Successively, deck B comes across the same process.

c) Recording operation test (timer switch recording)

Set the timer switch to the recording mode and turn the power ON, and about 4 seconds later deck B starts recording, in which it turns it performs recording at a recording level of -22 dB for 3 seconds, recording at a recording level of $-\infty$ dB for 5 seconds, and rewinds the tape up to the recording start position, then performs play for 8 seconds, and stops.

During the time of period from recording start until stop, the display is made indicating the recording operation test.

Segments h-p of grid 2 light one after one in sequence, while the rest a-g are off.

$h \rightarrow i \rightarrow j \rightarrow k \rightarrow l \rightarrow m \rightarrow n \rightarrow o \rightarrow p \rightarrow h \rightarrow \dots$

(The nine segments constituting the second-order digit of the counter and a colon are lighting one after one, and the rest seven segments constituting the third-order digit are off.)

d) Deck A cassette half ignorance and forward play

When the RVS PLAY key of deck A is pressed irrespective of the time switch position, the deck performs forward play with or without a cassette tape.

e) 3-second recording and play

When the REC key is pressed, after recording is made for 3 seconds, the tape is rewound up to the recording start position and is played.

f) Recording VR level

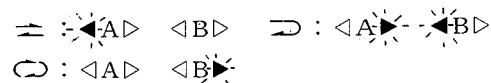
The recording VR level at power ON is set at -22 dB for the test mode (-15 dB for normal operation modes).

The recording VR level during the test mode is of 3 states: $-\infty$ dB, -22 dB and 0 dB.

When UP key is pressed: $-\infty$ dB $\rightarrow$ -22 dB,
 -22 dB $\rightarrow$ 0 dB

When DOWN key is pressed: 0 dB $\rightarrow$ -22 dB,
 -22 dB $\rightarrow$ $-\infty$ dB

The level setting is made as above.



g) Reverse mode switch check

Depending upon the reverse mode switch position, the direction indication of decks A and B differs.

h) Auto bias

When decks A and B are both in stop, when the AUTO BIAS key is pressed, the auto bias operation is started. At this time, the auto bias setting takes 23 seconds, approximately half in a normal operation mode. (No operation is made unless TEST pin is shorted by a diode.)

i) CCRS

When the CCRS key is pressed with the CCRS indicator off, the recording VR level is set to 0 dB, then the CCRS indicator flickers, and the recording pause mode is entered. At this time, any other key than the STOP key of deck B is not accepted. When the STOP key is pressed, the CCRS indicator lights to indicate that CCRS is already set.

When the CCRS key is pressed with the CCRS indicator lighting, the CCRS indicator goes out to indicate that CCRS is canceled from setting.

j) X. FADE

When the X. FADE key is pressed during the recording operation of deck B, "FADE" appears on the counter display portion. Each time the key is pressed, the "FADE" display is turned on/off.

CIRCUIT DESCRIPTION

k) Line mute OFF at CCRS/auto bias

During the test mode, the line mute is always OFF during the CCRS/auto bias setting as well.

l) 1.5-second key acceptance inhibit and mute ON at power ON

At power ON, any key acceptance is inhibited with the line mute ON for about 1.5 seconds. (For a normal operation mode, at power ON, any key acceptance is inhibited with the line mute ON for about 4 seconds.)

m) MPX ON/OFF pin test

Since the selector memory of the microprocessor is subject to initial setting to "tuner" at initial power ON, the MPX ON/OFF pin becomes "H" for recording or recording pause.

When the CCRS key is pressed, the selector memory is set to "CD", then the recording pause mode is engaged, and the MPX ON/OFF pin becomes "L". After that, until the STOP key of deck B is pressed and the CCRS key is re-pressed to cancel CCRS, the selector memory remains set to "CD", and this memory thus returns to "tuner" concurrently with the cancellation of CCRS.

* For TEST1 and TEST2, no automatic selection between counters A and B is made in some operations.

5-2 TEST2

(1) Setting method

Short KS3 (pin 20) and KR2 (pin 20) by a diode. Only for display all lighting test, turn the power ON with them shorted by a diode. Otherwise, for each test item of TEST2 can be performed if the test point is shorted by a diode.

(2) Canceling method

Press the PAUSE key of deck A or B and disconnect away the diode.

(3) Operation specification

a) Directly selectable between play and recording modes
When the REC key is pressed during play, the recording operation is entered.

b) FADER (pin 27) ON/OFF

When the X. FADE key is pressed with deck B in recording mode, the FADER pin turns ON/OFF cyclically.

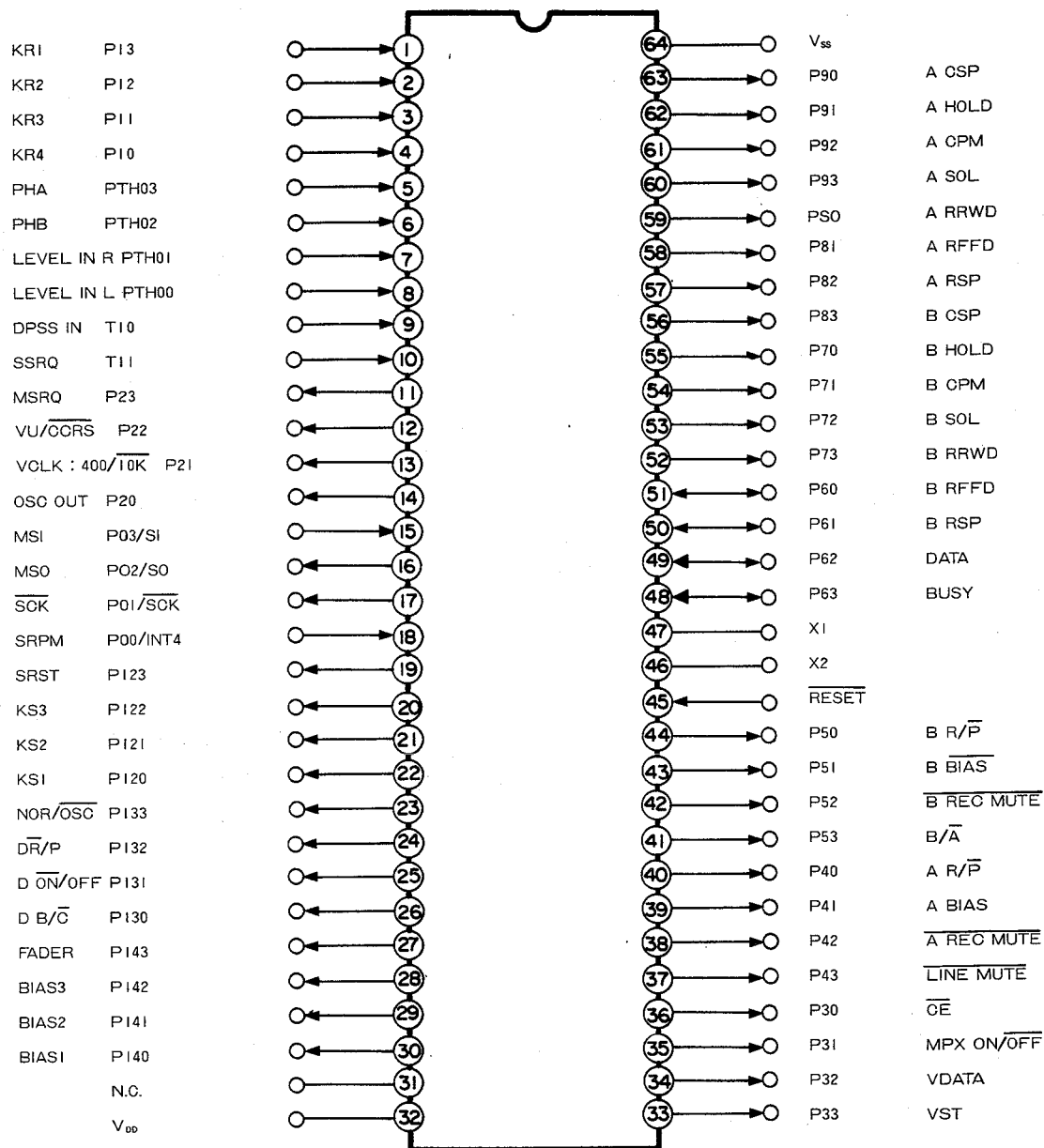
c) Auto bias

When the AUTO BIAS key is pressed with deck B in stop mode, the auto bias operation is entered immediately and deck A stops. At this time, the auto bias setting takes the same time (about 46 seconds) as in a normal operation mode.

CIRCUIT DESCRIPTION

IC14: μ PD75112CW-031 (X28-2070-00)
Microprocessor (Master)

Pin connection



CIRCUIT DESCRIPTION

Pin Functions:

Pin No.	Pin name	I/O	Symbol	Function
1	P13	I	KR1	Mechanism switch input H : SW OFF L : SW ON
2	P12	I	KR2	Mechanism switch input H : SW OFF L : SW ON
3	P11	I	KR3	Mechanism switch input H : SW OFF L : SW ON
4	P10	I	KR4	Mechanism switch input H : SW OFF L : SW ON
5	PTH03	I	PHA	Mechanism A rotation detection sensor input
6	PTH02	I	PHB	Mechanism B rotation detection sensor input
7	PTH01	I	LEVEL R	CCRS, auto bias and meter signal input (for X-93 only)
8	PTH00	I	LEVEL L	CCRS, auto bias and meter signal input
9	TI0	I	DPSS IN	Section-between-tunes signal input H : With tune L : Without tune
10	TI1	I	SSRQ	Slave microprocessor send request signal H : With send request L : Without send request
11	P23	O	MSRQ	Master microprocessor send request signal H : With send request L : Without send request
12	P22	O	VU	Level detection amplifier sensitivity output H : Normally L : CCRS, auto bias
13	P21	O	VCLK: 400/10K	Electronic VR serial data clock Filter selection for auto bias H : 400 Hz L : 10 kHz
14	P20	O	OSC	400 Hz/10 kHz square wave output
15	P03/SI	I	MSI	Master-slave communication serial data input
16	P02/SO	O	MSO	Master-slave communication serial data output
17	P01/SCK	O	SCK	Master-slave communication serial data shift clock output
18	P00/INT4	I	SRRM	Slave microprocessor reception acknowledge signal input H : Reception OK L : Reception NG
19	P123	O	SRST	Slave microprocessor reset output H : Reset L : Normal
20	P122	O	KS3	Mechanism switch scan output H : OFF L : Scan
21	P121	O	KS2	Mechanism switch scan output H : OFF L : Scan
22	P120	O	KS1	Mechanism switch scan output H : OFF L : Scan
23	P133	O	NOR/OSC	Auto bias input selection, level detection sensitivity selection H : NOR, CCRS L : A, BIAS
24	P132	O	DR/P	Dolby REC/play selection. H : Play L : REC
25	P131	O	D ON/OFF	Dolby ON/OFF selection H : OFF L : ON
26	P130	O	D B/C	Dolby B/C selection. H : B type L : C type

CIRCUIT DESCRIPTION

Pin No.	Pin name	I/O	Symbol	Function											
27	P143	O	FADER	Bias fade-in control output	H : ON L : OFF										
28	P142	O	BIAS3	Bias selection output	H : ON L : OFF										
29	P141	O	BIAS2	Bias selection output. Center bias with this pin ON	H : ON L : OFF										
30	P140	O	BIAS1	Bias selection output	H : ON L : OFF										
31	N.C.	—	—	Open											
32	V _{DD}	—	—	Connected to +5 V.											
33	P33	O	VST	Electronic volume unit strobe signal output											
34	P32	O	VDATA	Electronic volume unit serial data output											
35	P31	O	MPX ON/OFF	MPX control output	H : ON L : OFF										
36	P30	O	$\overline{CE}$	Backup detection output	H : Power ON L : Power OFF										
37	P43	O	$\overline{LINE\ MUTE}$	Line mute control output	H : Mute OFF L : Mute ON										
38	P42	O	$\overline{A\ REC\ MUTE}$	Deck A recording mute	H : Mute OFF L : Mute ON										
39	P41	O	A BIAS	Deck A bias ON/OFF	H : Bias ON L : Bias OFF										
40	P40	O	A R/ $\overline{P}$	Deck A recording/ $\overline{\text{play}}$ selection	H : Recording L : Play										
41	P53	O	B/ $\overline{A}$	Play EQ E/A selection	H : B L : A										
42	P52	O	$\overline{B\ REC\ MUTE}$	Deck B recording mute	H : Mute OFF L : Mute ON										
43	P51	O	$\overline{B\ BIAS}$	Deck B bias ON/OFF	H : Bias ON L : Bias OFF										
44	P50	O	B R/ $\overline{P}$	Deck B recording/ $\overline{\text{play}}$ selection	H : Recording L : Play										
45	$\overline{\text{RESET}}$	I	$\overline{\text{RESET}}$	Reset input	H : Normal L : Reset										
46	X2	O	—	Ceramic OSC connection pin	f = 4.19 MHz										
47	X1	I	—	Ceramic OSC connection pin	f = 4.19 MHz										
48	P63	I/O	BUSY	System control serial data I/O											
49	P62	I/O	DATA	System control serial data I/O											
50	P61	I/O	B RSP	Deck B reel motor speed selection	H : Play or recording L : Others										
51	P60	O	B RFFD	Deck B reel motor control	<table><tr><td>B RFFD</td><td>H</td><td>L</td></tr><tr><td>B RRWD</td><td>L</td><td>H</td></tr><tr><td></td><td>FF</td><td>RWD</td></tr></table>		B RFFD	H	L	B RRWD	L	H		FF	RWD
B RFFD	H	L													
B RRWD	L	H													
	FF	RWD													
52	P73	O	B RRWD	Deck B reel motor control											
53	P72	O	B SOL	Deck B solenoid control	H : ON L : OFF										

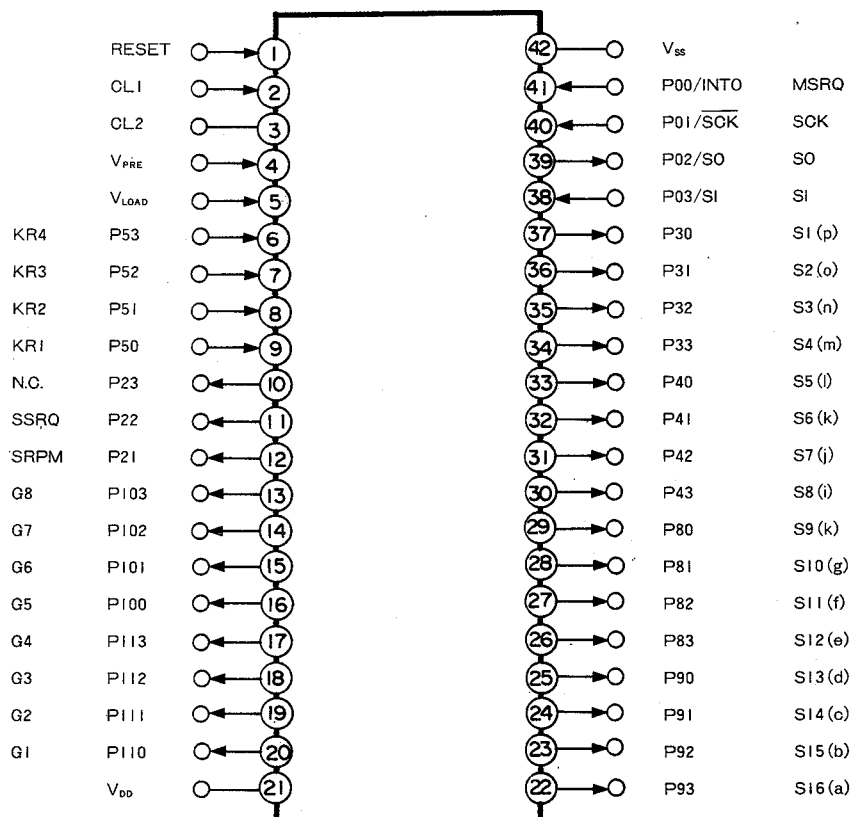
CIRCUIT DESCRIPTION

Pin No.	Pin name	I/O	Symbol	Function												
54	P71	O	B CPM	Deck B capstan motor control	H : ON L : OFF											
55	P70	O	B HOLD	Deck B solenoid control												
56	P83	O	B CSP	Deck B capstan motor speed selection	H : Normal speed L : High speed											
57	P82	O	A RSP	Deck A reel motor speed selection	H : Play or recording L : Others											
58	P81	O	A RFFD	Deck A reel motor control	<table><tr><td>B RFFD</td><td>H</td><td>L</td></tr><tr><td>B RRWD</td><td>L</td><td>H</td></tr><tr><td></td><td>FF</td><td>RWD</td></tr></table>			B RFFD	H	L	B RRWD	L	H		FF	RWD
B RFFD	H	L														
B RRWD	L	H														
	FF	RWD														
59	P80	O	A RRWD	Deck A reel motor control												
60	P93	O	A SOL	Deck A solenoid control	H : ON, L : OFF											
61	P92	O	A CPM	Deck A capstan motor control	H : ON L : OFF											
62	P91	O	A HOLD	Deck A solenoid control												
63	P90	O	A CSP	Deck A capstan motor speed control	H : Normal speed L : High speed											
64	V _{ss}	O	—	Connected to GND.												

CIRCUIT DESCRIPTION

IC1: μ PD7537 ACU-214 (X25-3700-00)
Microprocessor (slave)

Pin connection



Pin Functions

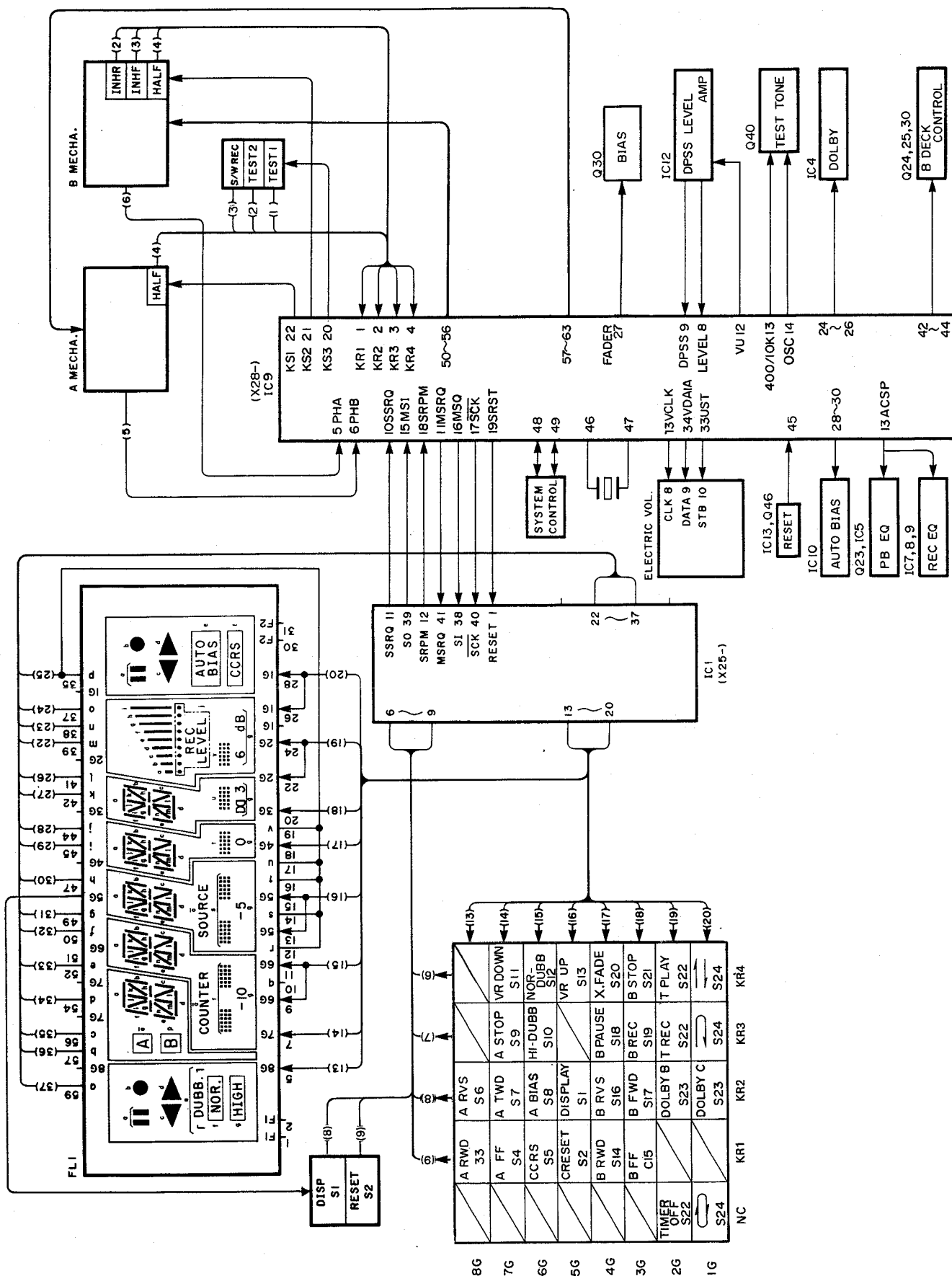
Pin No.	Pin name	I/O	Symbol	Function
1	RESET	I	RESET	Reset input pin H : Reset L : Normal
2	CL1	I	—	Ceramic OSC connection pin, 600 kHz
3	CL2	O	—	Ceramic OSC connection pin, 600 kHz
4	V _{PRE}	—	—	FL driver predriver power supply pin
5	V _{LOAD}	—	—	FL driver negative power supply pin
6	P53	I	KR4	Key switch input pin H : SW ON L : SW OFF
7	P52	I	KR3	Key switch input pin H : SW ON L : SW OFF
8	P51	I	KR2	Key switch input pin H : SW ON L : SW OFF
9	P50	I	KR1	Key switch input pin H : SW ON L : SW OFF
10	P23	O	—	
11	P22	O	SSRQ	Slave microprocessor send request signal output H : With send request L : Without send request

CIRCUIT DESCRIPTION

Pin No.	Pin name	I/O	Symbol	Function	
12	P21	O	SRPM	Slave microprocessor reception acknowledge output	H : Reception OK L : Reception NG
13	P103	O	G8	Grid drive and key scan output	H : ON L : OFF
14	P102	O	G7	Grid drive and key scan output	H : ON L : OFF
15	P101	O	G6	Grid drive and key scan output	H : ON L : OFF
16	P100	O	G5	Grid drive and key scan output	H : ON L : OFF
17	P113	O	G4	Grid drive and key scan output	H : ON L : OFF
18	P112	O	G3	Grid drive and key scan output	H : ON L : OFF
19	P111	O	G2	Grid drive and key scan output	H : ON L : OFF
20	P110	O	G1	Grid drive and key scan output	H : ON L : OFF
21	V _{DD}	—	—	+ B power supply pin (+ 5 V)	
22	P93	O	S16 (a)	FL segment drive output	
23	P92	O	S15 (b)	FL segment drive output	
24	P91	O	S14 (c)	FL segment drive output	
25	P90	O	S13 (d)	FL segment drive output	
26	P83	O	S12 (e)	FL segment drive output	
27	P82	O	S11 (f)	FL segment drive output	
28	P81	O	S10 (g)	FL segment drive output	
29	P80	O	S9 (h)	FL segment drive output	
30	P43	O	S8 (i)	FL segment drive output	
31	P42	O	S7 (j)	FL segment drive output	
32	P41	O	S6 (k)	FL segment drive output	
33	P40	O	S5 (l)	FL segment drive output	
34	P33	O	S4 (m)	FL segment drive output	
35	P32	O	S3 (n)	FL segment drive output	
36	P31	O	S2 (o)	FL segment drive output	
37	P30	O	S1 (p)	FL segment drive output	
38	P03/SI	I	SI	Master-slave communication serial data input	H : 1 L : 0
39	P02/SO	O	SO	Master-slave communication serial data output	H : 1 L : 0
40	P01/ $\overline{\text{SCK}}$	I	SCK	Master-slave communication serial data clock input	
41	P00/INTO	I	MSRQ	Master send request signal input	
42	V _{SS}	—	—	GND pin	

CIRCUIT DESCRIPTION

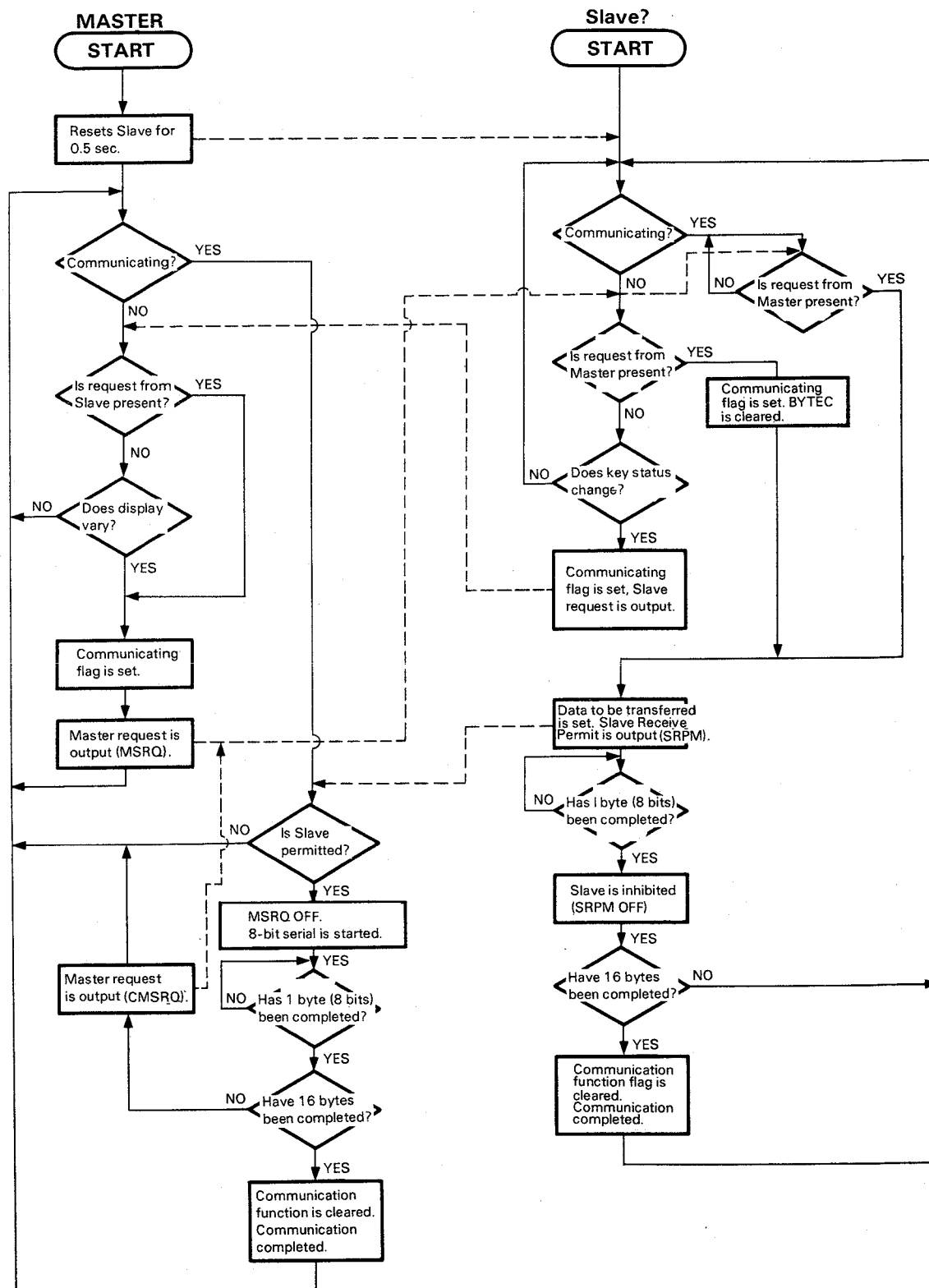
Block Diagram (Microcomputer and the peripheral components)



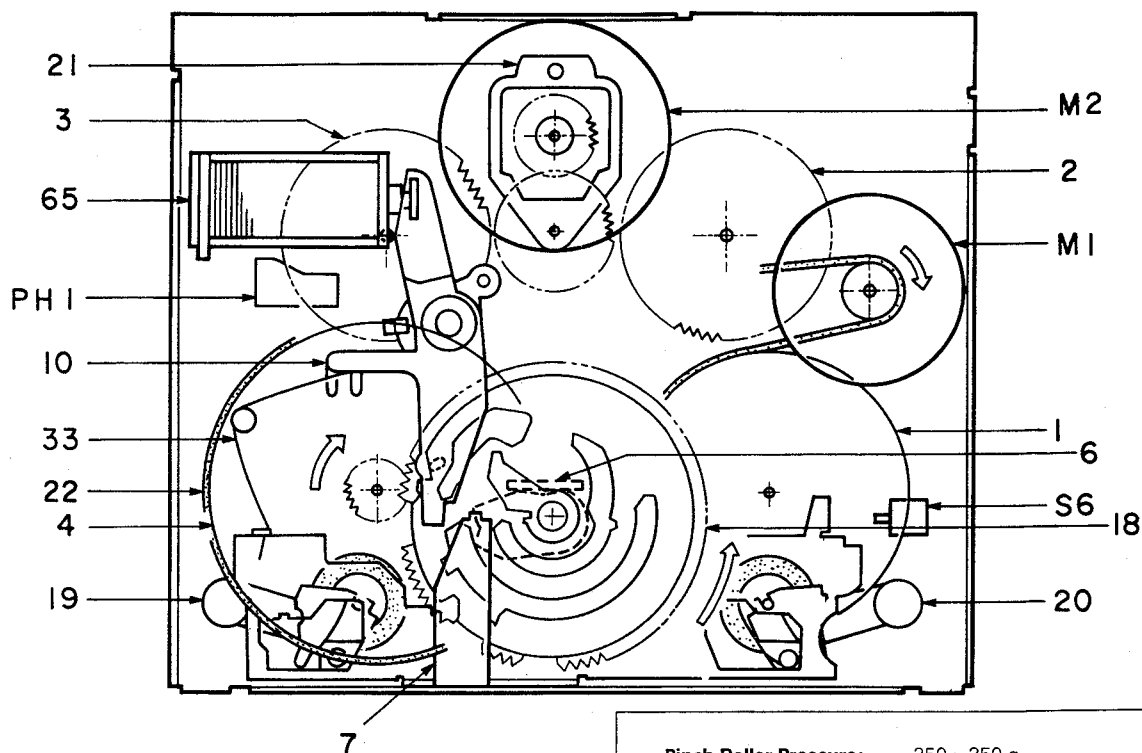
CIRCUIT DESCRIPTION

Microprocessor Communication Flowchart

This unit uses two microprocessors; the master microprocessor controlling the mechanism and circuitry and slave microprocessor controlling the key inputs and display.



MECHANISM OPERATION DESCRIPTION



Pinch Roller Pressure:	250~350 g
Take-up Torque:	30~70 g·cm (2.5 V)
FF. REW Torque:	90~180 g·cm (3.8 V)
Back Tension Torque:	2~6 g·cm

STOP to FWD PLAY/REC Operation

Press the PLAY key.

Only in the STOP to REC mode, the REEL MOTOR rotates in the REW direction for 20 msec. to rewind the tape slightly.

By a signal from the microcomputer, the CAPSTAN MOTOR M1 rotates, and the SOLENOID (65) turns ON.

The PLAY ARM (10) swings in the direction of the arrow (➡ **A**).

The pin **B** of the PLAY ARM is released from the stopper section **C** of the CAM GEAR (18).

The CAM GEAR rotates slightly and engages with the gear of the FLYWHEEL (4).

After a while, the SOLENOID turns OFF.

Since the SLIDER (7) is pushed by the torsion spring (33) in the direction of the arrow (➡), the protrusion swings along the orbit **H**.

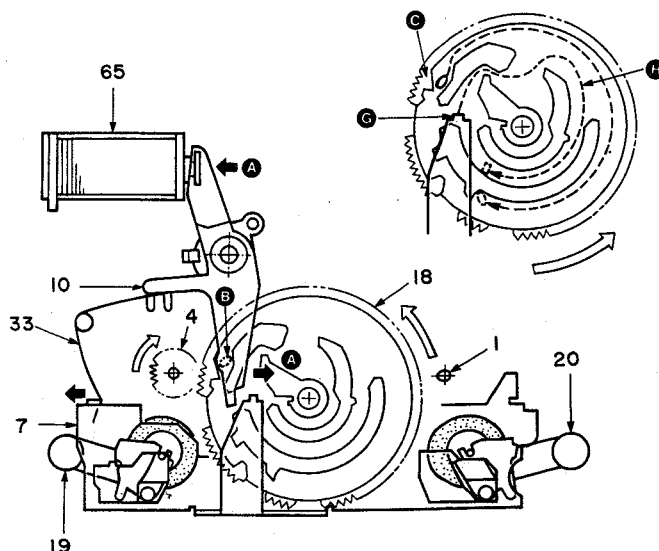


Fig. 2 STOP to FWD (forward) PLAY/REC operation

MECHANISM OPERATION DESCRIPTION

The bending section **E** of the HEAD BASE (6) is lifted by the cam **F** of the CAM GEAR and begins moving upward.

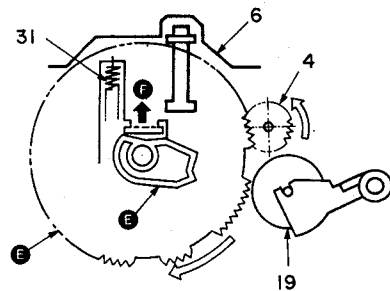


Fig. 3 (Front side view)

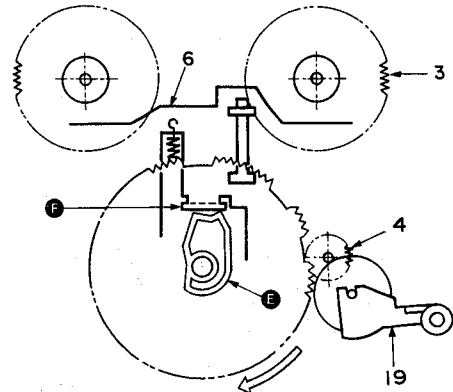


Fig. 4 STOP→PLAY/REC (Front side view)

When the CAM GEAR is rotated by about 3/4 of a revolution, the pin **B** of the PLAY ARM comes into contact with the stopper **D** of the CAM GEAR. At this time, the non-tooth section of the CAM GEAR reaches the gear of the FLYWHEEL, and the CAM GEAR stops rotating. When the HEAD BASE comes to the top end, the boss **L** of the pinch roller (L) comes into contact with the edge **J** of the SLIDER and it does not press the capstan. Since the boss **K** of the pinch roller (R) is inserted into the groove of the SLIDER, it is pressed to the capstan and the deck enters the FWD PLAY mode.

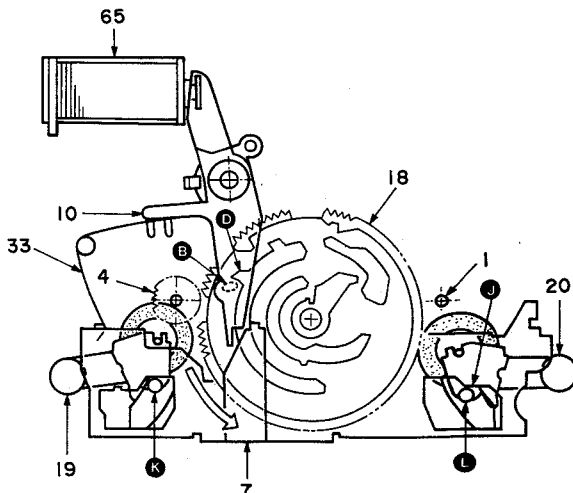


Fig. 5 FWD PLAY status

MECHANISM OPERATION DESCRIPTION

STOP to RVS (reverse) PLAY/REC Operation

Press the PLAY key.

Only in the STOP to REC mode, the REEL MOTOR rotates in the REW direction for 20 msec. to rewind the tape slightly.

By a signal from the microcomputer, the CAPSTAN MOTOR M1 rotates, and the SOLENOID (65) turns ON.

The PLAY ARM (10) swings in the direction of the arrow

A.

The pin **B** of the PLAY ARM is released from the stopper section **C** of the CAM GEAR (18).

The CAM GEAR rotates slightly and engages with the gear of the FLYWHEEL (4).

The SOLENOID turns OFF, and CAM GEAR is still rotating.

When the SOLENOID turns ON again, the protrusion **G** is pushed by the edge **L** of the PLAY ARM, and SWINGS along the orbit **M**.

By the cam **N** of the CAM GEAR, the SLIDER moves largely in the direction of the arrow

The bending section **F** of the HEAD BASE (6) is lifted by the cam **E** of the CAM GEAR and begins moving upward.

When the CAM GEAR is rotated by about 3/4 of a revolution, the pin **B** of the PLAY ARM comes into contact with the stopper **D** of the CAM GEAR.

At this time, the non-tooth section of the CAM GEAR reaches the gear of the FLYWHEEL, and the CAM GEAR stops rotating.

When the HEAD BASE comes to the top end, the boss **K** of the pinch roller (R) comes into contact with the edge **J** of the SLIDER and it does not press the capstan.

Since the boss **J** of the pinch roller (L) is inseted into the groove of the SLIDER, it is pressed to the capstan and the deck enters the RVS (reverse) PLAY mode.

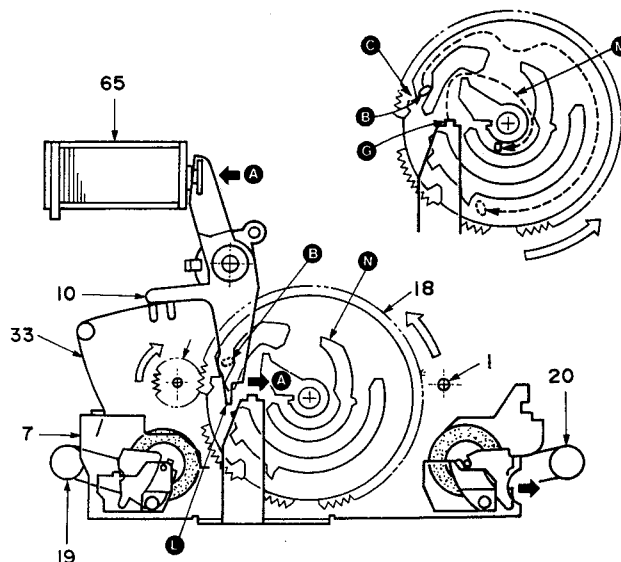


Fig. 6 STOP to RVS PLAY/REC operation

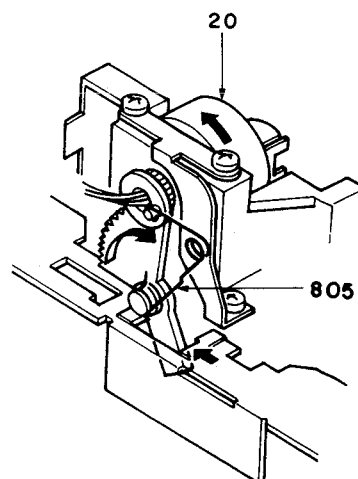


Fig. 7 Head selection (FWD to RVS)

MECHANISM OPERATION DESCRIPTION

FWD (forward) PLAY/REC to STOP Operation

Press the STOP key.

By a signal from the microcomputer, the SOLENOID (65) turns OFF.

The PLAY ARM (10) is swung in the direction of the arrow **A** by the TORSION SPRING (33), and the pin **B** is released from the stopper **D**.

The CAM GEAR is slightly rotated by the HEAD BASE in the direction of the arrow.

The CAM GEAR is engaged with the gear of the FLY-WHEEL (4) and continues rotating.

The protrusion **G** of the SLIDER (7) passes through the orbit **P**.

When the pin **B** of the PLAY ARM comes into contact with the stopper **C** of the CAM GEAR, the CAM GEAR stops rotating.

By the signal from the microcomputer, the CAPSTAN MOTOR stops and the deck enters the stop mode.

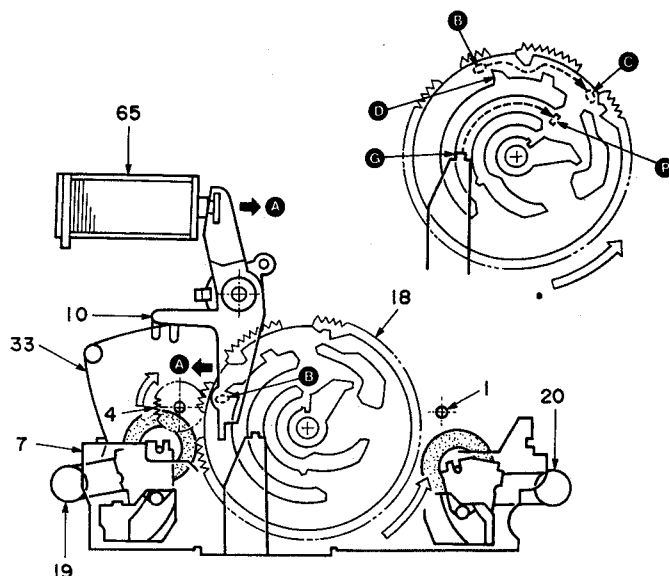


Fig. 8 FWD PLAY/REC to STOP operation

RVS (reverse) PLAY/REC to STOP Operation

Press the STOP key.

By a signal from the microcomputer, the SOLENOID (65) turns OFF.

The PLAY ARM (10) is swung in the direction of the arrow **A** by the TORSION SPRING (33), and the pin **B** is released from the stopper **D**.

The CAM GEAR is slightly rotated by the HEAD BASE in the direction of the arrow **Q**.

The CAM GEAR is engaged with the gear of the FLY-WHEEL (4) and continues rotating.

The protrusion **G** of the SLIDER (7) passes through the orbit **Q**.

When the pin **B** of the PLAY ARM comes into contact with the stopper **C** of the CAM GEAR, the CAM GEAR stops rotating.

By the signal from the microcomputer, the CAPSTAN MOTOR stops and the deck enters the stop mode.

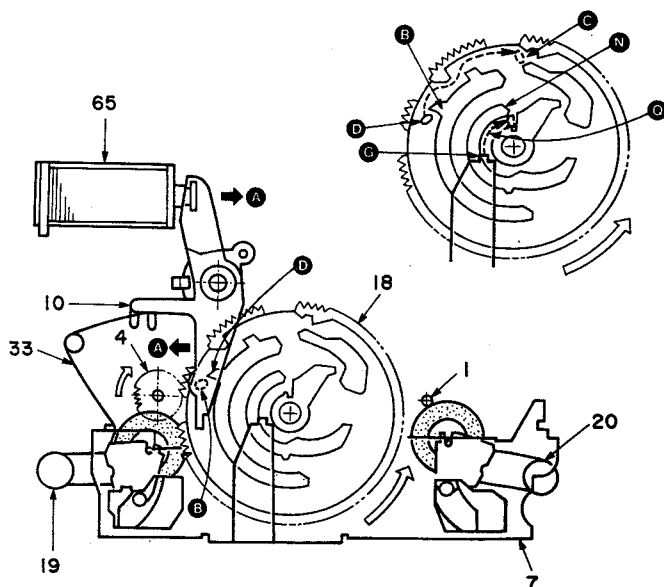


Fig. 9 RVS PLAY/REC to STOP operation

MECHANISM OPERATION DESCRIPTION

STOP to FF/REW Operation

By a signal from the microcomputer, the SOLENOID (65) turns ON. At the same time, the REEL MOTOR M2 starts rotating in the appropriate direction. (REW: CW ↻, FF: ↻ CCW)

According to the rotating direction of the REEL MOTOR, the IDLER ASS'Y (21) is swung in the appropriate direction. (REW: Ⓑ ↻, FF: ↻ Ⓐ)

When the gear of the IDLER ASS'Y engages with the gear of the REEL ASS'Y (2, 3), the deck enters the FF/REW operation mode.

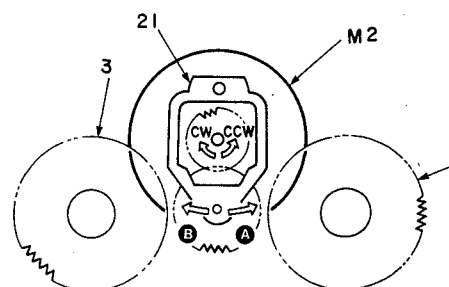


Fig. 10 (FRONT SIDE VIEW)

PLAY to CUE/REVIEW (REV) Operation

Press the FF/REW key during PLAY.

By a signal from the microcomputer, the SOLENOID (65) turns OFF.

The PLAY ARM (10) is swung in the direction of the arrow ↻ Ⓐ by the TORSION SPRING (33), and the pin Ⓑ is released from the stopper Ⓓ.

After approx. 40 msec., the SOLENOID is turned ON again.

The pin Ⓑ of the PLAY ARM passed by the internal orbit, and then comes into contact with the stopper Ⓒ of the CAM GEAR.

At this time, the non-tooth section of the CAM GEAR comes to the gear of the FLYWHEEL, and the CAM GEAR stops rotating at the position where the HEAD BASE (6) is lowered slightly to that position.

The PINCH ROLLER (19, 20) is released from the CAPSTAN in accompanied with lowering movement of the HEAD BASE.

After a while, the CAPSTAN MOTOR stops rotating, and at the same time, the REEL MOTOR rotates in the appropriate direction to activate the CUE and REVIEW (REV) operations.

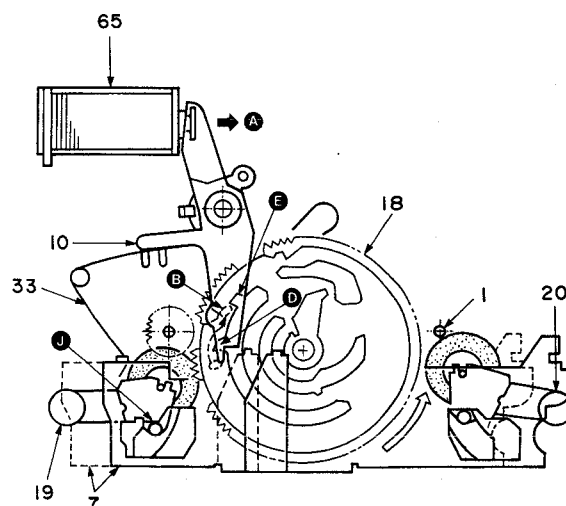


Fig. 11 PLAY to CUE/REV operation

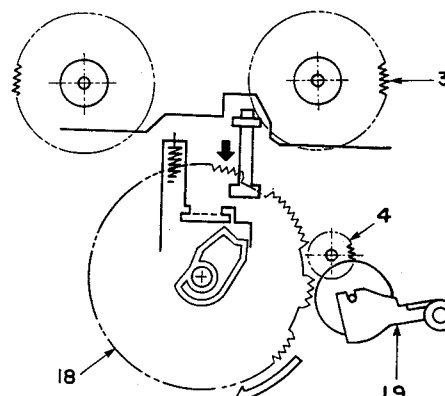
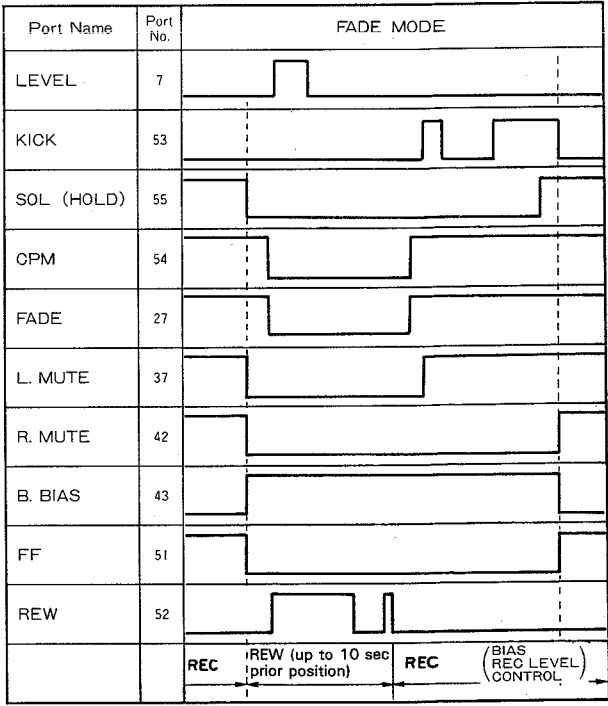
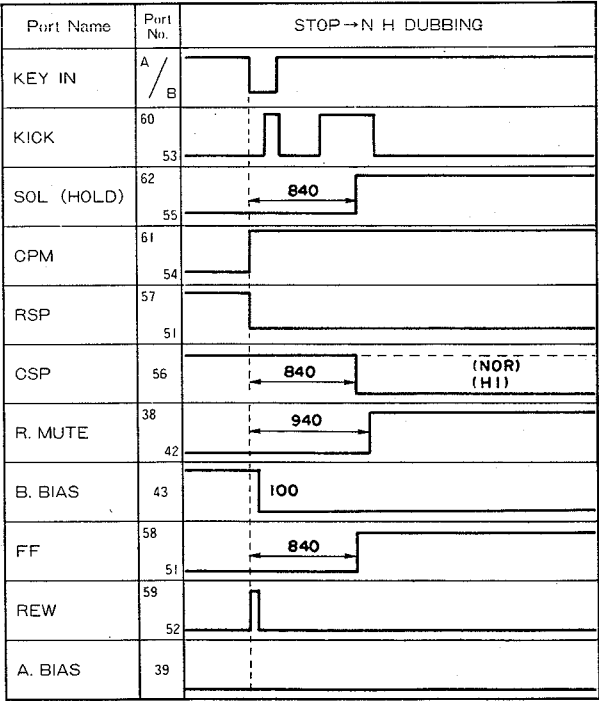
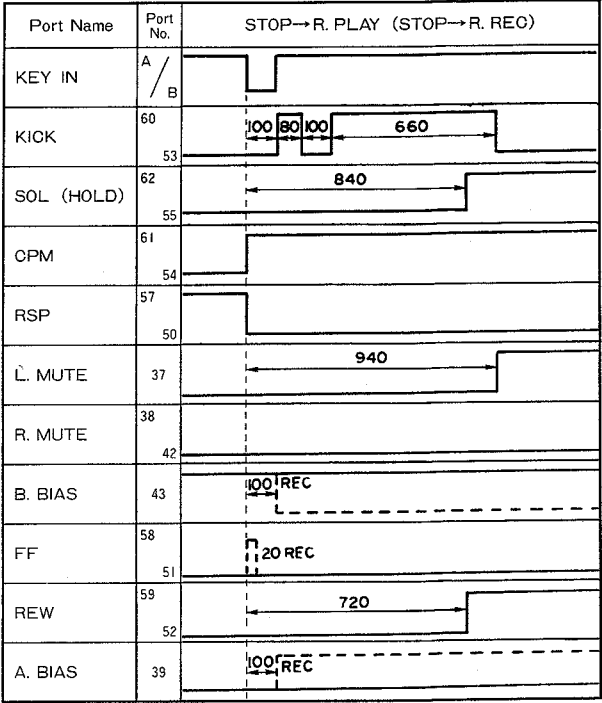
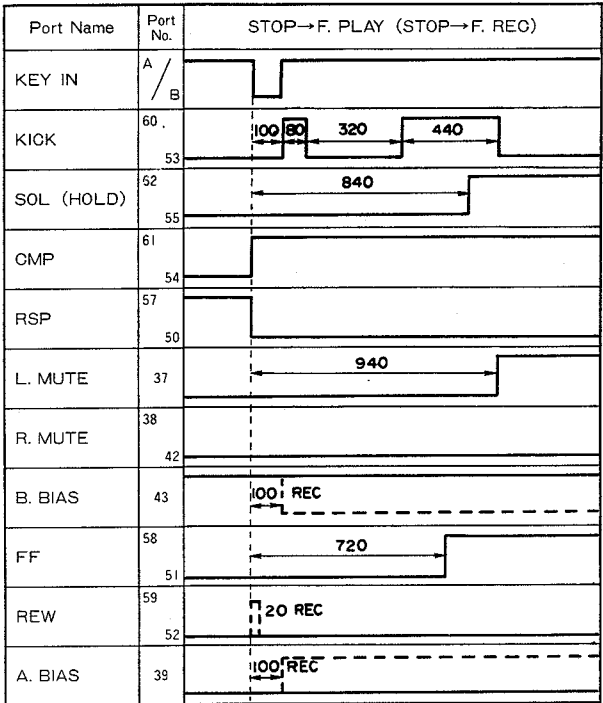


Fig. 12 CUE/REV status (Front side view)

MECHANISM OPERATION DESCRIPTION

TIMING CHART



MECHANISM OPERATION DESCRIPTION

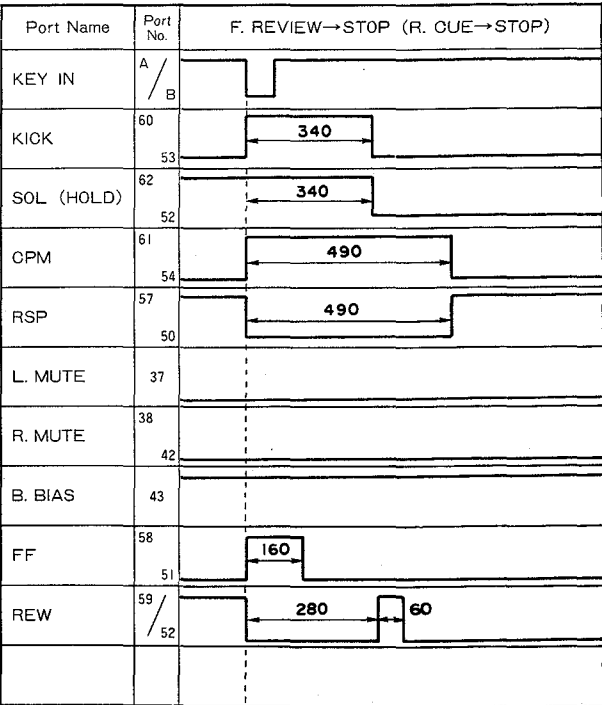
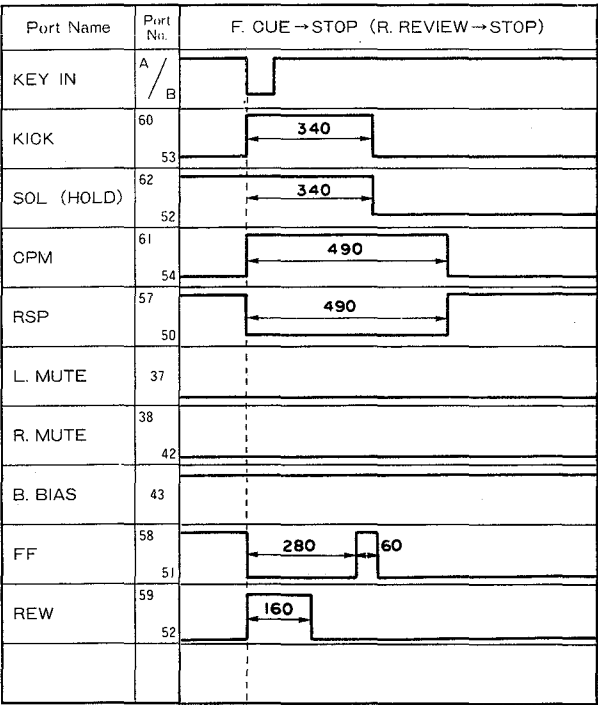
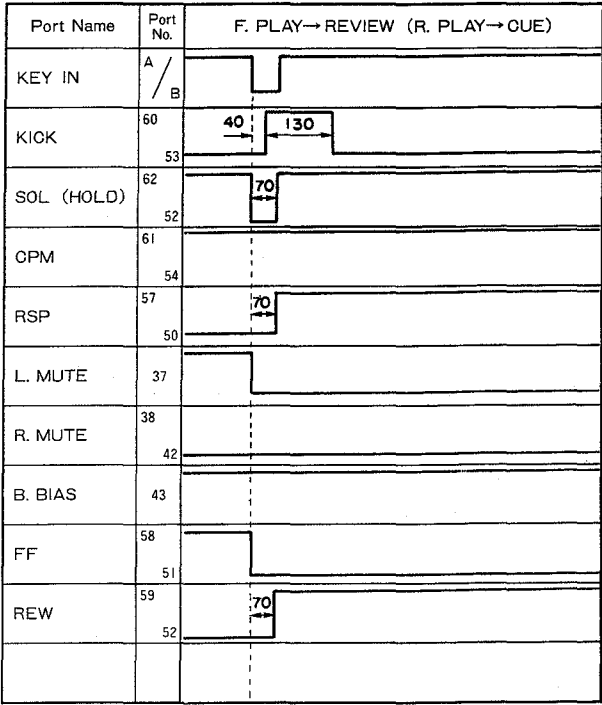
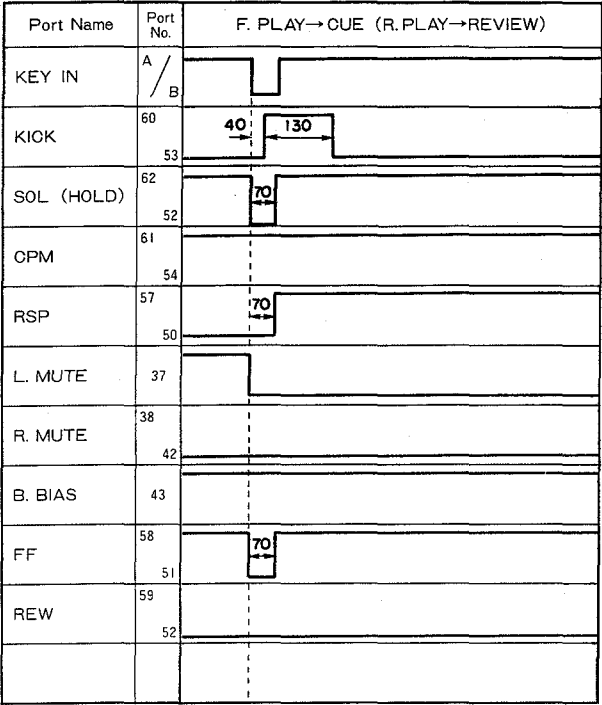
Port Name	Port No.	F. REC→STOP
KEY IN	A / B	
KICK	60 / 53	
SOL (HOLD)	62 / 52	
CPM	61 / 54	
RSP	57 / 50	
L. MUTE	37	
R. MUTE	38 / 42	
B. BIAS	43	
FF	58 / 51	
REW	59 / 52	
A. BIAS	39	

Port Name	Port No.	R. REC→STOP
KEY IN	A / B	
KICK	60 / 53	
SOL (HOLD)	62 / 52	
CPM	61 / 54	
RSP	57 / 50	
L. MUTE	37	
R. MUTE	38 / 42	
B. BIAS	43	
FF	58 / 51	
REW	51 / 52	
A. BIAS	39	

Port Name	Port No.	STOP→FF→STOP
KEY IN	A / B	
KICK	60 / 53	
SOL (HOLD)	62 / 52	
CPM	61 / 54	
RSP	57 / 50	
L. MUTE	37	
R. MUTE	38 / 42	
B. BIAS	43	
FF	58 / 51	
REW	59 / 52	
A. BIAS	39	

Port Name	Port No.	STOP→REW→STOP
KEY IN	A / B	
KICK	60 / 53	
SOL (HOLD)	62 / 52	
CPM	61 / 54	
RSP	57 / 50	
L. MUTE	37	
R. MUTE	38 / 42	
B. BIAS	43	
FF	58 / 51	
REW	59 / 52	
A. BIAS	39	

MECHANISM OPERATION DESCRIPTION



ADJUSTMENT

Order	Item	Input setting	Output setting	Deck setting	Adjustment points	Adjustment method	Fig.
Unless otherwise specified, set the respective switches as follows: TAPE: NORMAL DOLBY: OFF INPUT: LINE I. Cassette mechanism section (Recording/play head adjustment)							
0 dBs = 0.775 V							
[1]	Degaussing and cleaning	—	—	Power: OFF, Degaussing, Cleaning, PLAY	Recording heads, Erase heads, Capstans, Pinch rollers	Degauss the recording/play heads by a head eraser. Clean the recording/play heads, erase heads, capstans and pinch rollers by a cotton swab soaked with alcohol.	
[2]	Recording/play head azimuth	TTC-153 MTT-114 10 kHz, -10 dBs	(B)	PLAY	Azimuth adjustment screw	Maximize the output and adjust so that the Lissajous figure nears a line slanted 45°.	(a)
II. Printed circuit board adjustment (X28-2070) Note: First perform the double-speed adjustment.							
<1>	Tape speed (double)	TCC-110 MTT-111 3 kHz	(B)	Connect TP2 and TP3 to GND. PLAY	VR1 and VR2 on mechanism board of each of decks A and B	Adjust so that the frequency is 5 kHz at the tape center.	
<2>	Tape speed (normal)	TCC-110 MTT-111 3 kHz	(B)	Disconnect TP2 and TP3 from GND. PLAY	VR3 and VR4 on mechanism board of each of decks A and B	Adjust so that the frequency is 3 kHz at the tape center.	
III. Printed circuit board adjustment (X28-2070-00)							
<1>	Playback level	MTT-150 400 Hz	(B)	PLAY	A DECK: VR1 (L) VR2 (R) B DECK: VR3 (L) VR4 (R) (X28-2070)	Adjust so that the playback output is -6.0 dBs.	
		MTT-256 315 Hz				Adjust so that the playback output is -9.0 dBs.	
		MTT-256U, TCC-160 315 Hz				Adjust so that the playback output is -5.0 dBs.	
<2>	Bias current	(A) 1 kHz, -30 dBs 10 kHz, -30 dBs	(B)	Adjust electronic VRs so that the recording monitor output is -29 dBs at 1 kHz, then record 1 kHz and 10 kHz reciprocally, and play them back.	VR1 VR2 (X87-1190)	Record 1 kHz and 10 kHz reciprocally, and adjust so that they are identical in playback level.	
<3>	Recording level	(A) 1 kHz, -10 dBs	(B)	Under the situation of the above item <2>, record 1 kHz and play it back.	VR5 (L) VR6 (R) (X28-2070)	Adjust so that playback output is -9.0 dBs.	

REGLAGES

Ordre	Sujet	Réglage d'entrée	Réglage de sortie	Réglage de platine	Points d'ajustement	Méthode d'ajustement	Figure
A moins de spécification contraire, régler les commutateurs respectifs comme suit: TAPE: NORMAL DOLBY: OFF INPUT: LINE I. Section de mécanisme de cassette (ajustement de tête d'enregistrement/lecture)							0 dBs = 0,775 V
[1]	Démagnétisation et nettoyage	—	—	Alimentation coupée, démagnétisation, nettoyage, lecture	Têtes d'enregistrement, têtes d'effacement, cabestans, galets presseur	Démagnétiser les têtes d'enregistrement/lecture avec un effaceur de tête. Nettoyer les têtes d'enregistrement/lecture, les têtes d'effacement, les cabestans et les galets presseur avec un coton-tige trempé dans de l'alcool.	
[2]	Azimut de tête d'enregistrement/lecture	TCC-153 MTT-114 10 kHz, -10 dBs	(B)	PLAY	Vis d'ajustement de l'azimut	Maximiser la sortie et ajuster pour que la figure de Lissajous s'approche d'une ligne inclinée sur 45°.	(a)
II. Ajustement de la plaquette de circuits imprimés (X28-2070) Remarque: Effectuer d'abord l'ajustement de vitesse double.							
<1>	Vitesse de bande (double)	TCC-110 MTT-111 3 kHz	(B)	Connecter TP2 et TP3 sur GND. Lire	VR1 et VR2 sur la plaquette de mécanisme des platines A et B	Ajuster pour que la fréquence soit 5 kHz au centre de bande.	
<2>	Vitesse de bande (normale)	TCC-110 MTT-111 3 kHz	(B)	Déconnecter TP2 et TP3 de GND. Lire	VR3 et VR4 sur la plaquette de mécanisme de chaque platine A et B	Ajuster pour que la fréquence soit 3 kHz au centre de bande.	
III. Ajustement de plaquette de circuit imprimé (X28-2070-00)							
<1>	Niveau de lecture	MTT-150 400 Hz	(B)	PLAY	A DECK: VR1 (L) VR2 (R) B DECK: VR3 (L) VR4 (R) (X28-2070)	Ajuster pour que la sortie de lecture soit de -6,0 dBs.	
		MTT-256 315 Hz				Ajuster pour que la sortie de lecture soit de -9,0 dBs.	
		MTT-256U, TCC-160 315 Hz				Ajuster pour que la sortie de lecture soit de -5,0 dBs.	
<2>	Courant de polarisation	(A) 1 kHz, -30 dBs 10 kHz, -30 dBs	(B)	Ajuster les VR électroniques pour que la sortie de contrôle d'enregistrement soit de -29 dBs à 1 kHz puis enregistrer 1 kHz et 10 kHz réciproquement et les lire.	VR1 VR2 (X87-1190)	Enregistrer 1 kHz et 10 kHz réciproquement et ajuster pour qu'ils soient identiques au niveau de lecture.	
<3>	Niveau d'enregistrement	(A) 1 kHz, -10 dBs	(B)	Dans la situation de <2>, enregistrer 1 kHz et le lire.	VR5 (L) VR6 (R) (X28-2070)	Ajuster pour que la sortie de lecture soit de -9,0 dB.	

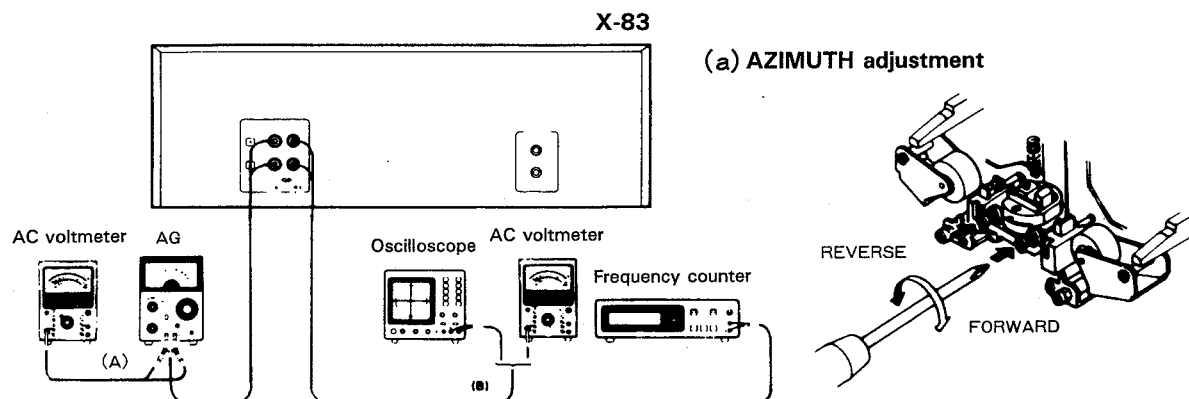
ABGLEICH

Reihenfolge	Gegenstand	Eingangs-Einstellung	Ausgangs-Einstellung	Deck-Einstellung	Abgleichpunkte	Abgleichmethode	Abbildung
Wenn nicht anders angegeben, die einzelnen Schalter wie folgt einstellen: TAPE: NORMAL DOLBY: OFF INPUT: LINE I. Kassettenmechanismus-Teil (Einstellung des Aufnahme-/Wiedergabekopfes)							
						0 dBs = 0,775 V	
[1]	Entmagnetisierung und Reinigung	—	—	Ausschalten, Entmagnetisierung, Reinigung, Wiedergabe	Aufnahmeköpfe, Löschköpfe, Tonwellen, Andruckrollen	Die Aufnahme-/Wiedergabeköpfe mit einem Tonkopf-Entmagnetisierer entmagnetisieren. Die Aufnahme-/Wiedergabeköpfe, die Löschköpfe, die Tonwellen und die Andruckrollen mit einem mit Alkohol befeuchteten Wattestäbchen reinigen.	
[2]	Azimuth des Aufnahme-/Wiedergabekopfes	TCC-153 MTT-114 10 kHz, -10 dBs	(B)	PLAY	Azimuth-Einstellschraube	Den Ausgang maximieren und so einstellen, daß die Lissajousfigur sich einer um 45° geneigten Linie annähert.	(a)
II. Leiterplatten-Einstellung (X28-2070) Hinweis: Zuerst die Einstellung für doppelte Geschwindigkeit durchführen.							
<1>	Bandgeschwindigkeit (doppelt)	TCC-110 MTT-111 3 kHz	(B)	TP2 und TP3 mit GND verbinden. Wiedergabe	VR1 und VR2 auf Mechanismen-Platinen von Deck A und B	So einstellen, daß die Frequenz in der Bandmitte 5 kHz beträgt.	
<2>	Bandgeschwindigkeit (normale)	TCC-110 MTT-111 3 kHz	(B)	TP2 und TP3 von GND abtrennen. Wiedergabe	VR3 und VR4 auf Mechanismen-Platinen von Deck A und B	So einstellen, daß die Frequenz in der Bandmitte 3 kHz beträgt.	
III. Leiterplatten-Einstellung (X28-2070-00)							
<1>	Wiedergabepegel	MTT-150 400 Hz	(B)	PLAY	A DECK: VR1 (L) VR2 (R) B DECK: VR3 (L) VR4 (R) (X28-2070)	So einstellen, daß der Wiedergabe-Ausgang -6,0 dBs beträgt.	
		MTT-256 315 Hz				So einstellen, daß der Wiedergabe-Ausgang -9,0 dBs beträgt.	
		MTT-256U, TCC-160 315 Hz				So einstellen, daß der Wiedergabe-Ausgang -5,0 dBs beträgt.	
<2>	Vormagnetisierungsstrom	(A) 1 kHz, -30 dBs 10 kHz, -30 dBs	(B)	Die elektronischen Regelwiderstände so einstellen, daß der Aufnahmemonitor-Ausgang -29 dBs bei 1 kHz beträgt, dann 1 kHz und 10 kHz abwechselnd aufnehmen und wiedergeben.	VR1 VR2 (X87-1190)	1 kHz und 10 kHz abwechselnd aufnehmen und so einstellen, daß sie im Wiedergabepegel identisch sind.	
<3>	Aufnahmepegel	(A) 1 kHz, -10 dBs	(B)	In der Situation wie beim obigen Punkt <2> 1 kHz aufnehmen und wiedergeben.	VR5 (L) VR6 (R) (X28-2070)	So einstellen, daß der Wiedergabe-Ausgang -9,0 dBs beträgt.	

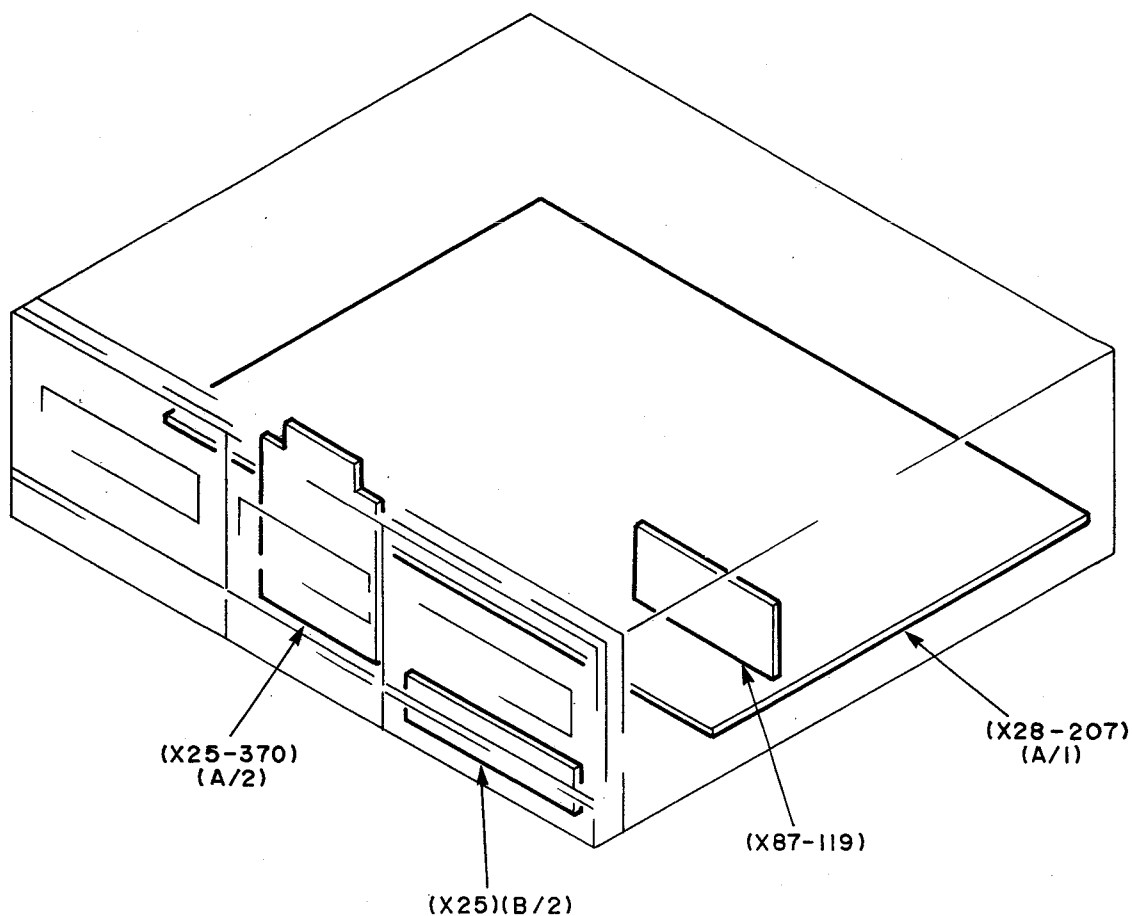
X-83

ADJUSTMENT/REGLAGES/ABGLEICH

Connection of measuring instrument



PC BOARD LAYOUT



VOLTAGE TABLES

X28-2072-71

IC1

1,2	7.2V
3	6.6V
4	0V
5	6.5V
6,7	7.2V
8	13.5V

IC2

1,2	7.2V
3	6.5V
4	0V
5	6.5V
6,7	7.2V
8	13.5V

IC3

1	0V
2	7.2V
3	6.8V
4,5	7.2V
6	7V
7	0V
8,9	4.4V
10	0V
11	7V
12,13	7.2V
14	6.8V
15	7.2V
16	13.5V

IC4

1	7.2V
2	0V
3	6.8V
4	7.2V
5	1.7V
6,7	7.4V
8~10	7.3V
11	7.3V
12,13	7.2V
14	1.1V
15	1V
16	7.2V
17	6.9V
18	7.2V
19,20	0V
21	7.3V
22	7.4V
23,24	0V
25	7.2V
26	6.8V
27	7.1V
28	1V
29	1.1V
30	7.2V
31,32	7.4V
33~35	7.4V
36,37	7.3V
38	0V
39	6.8V
40	0.7V
41	7.2V
42	13.5V

IC5

1~3	0V
4,5	2.9V
6,7	0V
8	2.9V
9,10	0V
11,12	7.8V
13	7V
14	0V
15	4.6V
16,17	2.9V
18~20	0V

IC7

1	NOR: 1.8V CrO ₂ : 0V MET: 0V
2	NOR: 0V CrO ₂ : 1.9V MET: 0V
3	NOR: 0V CrO ₂ : 1.9V MET: 0V
4	4.6V
5	NOR: 0.5V CrO ₂ : 0V MET: 0V
6	NOR: 0V CrO ₂ : 0.5V MET: 0.5V
7	NOR: 0V CrO ₂ : 0V MET: 0.6V
8,9	0V
10,11	1.3V
12	1.3V
13	0V
14	NOR: 1.3V CrO ₂ : 1.3V MET: 0V
15	NOR: 1.3V CrO ₂ : 0V MET: 1.3V
16	NOR: 0V CrO ₂ : 1.3V MET: 1.3V

IC8

1	3.6V
2	4.7V
3	3.8V
4,6	0.5V
7~9	0V

IC9

1~3	1.2V
4,5	0V
6	4.4V
7	4.9V
8	5.6V
9	5.7V
10	4.9V
11	4.4V
12	10V
13~16	1.2V

IC11

1	17.7V
2,3	3.8V
4	0V
5,6	3.8V
7	17.7V
8	30V

IC12

1	8.4V
2	8.3V
3	7.9V
4	0V
5	6.7V
6	8.4V
7	8.4V
8	17V

IC13

IN	4.4V
OUT	4.3V
GND	—

IC14

32	4.8V
33	0V
34	4.4V
35	4.3V
38	0V
64	0V

Q7,8

E	—
C	—
B	4.6V

Q9

E	—
C	0V
B	OTHER: 0.7V REC: 0V

Q10

E	—
C	0V
B	REC: 0V

Q13

E	7.2V
C	—
B	—

Q14

E	13.5V
C	—
B	—

Q15

E	0V
C	—
B	—

Q23

E	—
C	—
B	4.6V

Q24

E	3.8V
C	—
B	—

Q25

E	0V
C	—
B	REC: 0.7V

VOLTAGE TABLES

Q27

E	—
C	NOR: 7.8V CrO ₂ : 10.7V MET: 17.2V
B	—

Q28

E	—
C	17V A, BIAS NOR: 11.5~5.8V CrO ₂ : 17~7.3V
B	NOR: 7.8V CrO ₂ : 10.7V MET: 17.2V

Q30

E	0V
C	NOR: 7.8V CrO ₂ : 10.7V MET: 17.2V
B	OTHER: 0.7V REC: 0V

Q31

E	0V
C	—
B	X.FADE: 0.7V

Q32

E	4.3V
C	—
B	—

Q34

E	—
C	0V
B	NOR: 0V OTHER: 0.7V

Q35

E	5.1V
C	11.3V
B	—

Q36

E	19.1V
C	11.3V
B	—

Q37

E	—
C	0V
B	—

Q38

E	17V
C	37.5V
B	—

Q39

E	-28.5V
C	-38.4V
B	-29.1V

Q42

E	0V
C	0V
B	4.1V

Q43

E	0V
C	0V
B	0.6V

Q45

E	0V
C	A BIAS: 0.6V
B	—

Q47

E	3.8V
C	OTHER: 4V R/P: 0V
B	—

Q48

E	0V
C	—
B	P/R: 0.7V

Q49

E	0V
C	—
B	P/R: 0.7V

X25-3700-00

IC1

4	-23.1V
21	4.3V

X87-1190-05

IC1

1	4V
2	0V
3	3.9V
4	0.3V
5~8	0V
9	—
10	—
11~14	0V
15	0.3V
16	3.9V
17	3.9V
18	17V

Q2

E	—
C	17V
B	—

D40-0881-05
D40-0882-05

TA7291S

1	0V
2	11.7V
3~5	0V
6	9.2V
7	0V
8	7.2V
9	0V

1

2

3

4

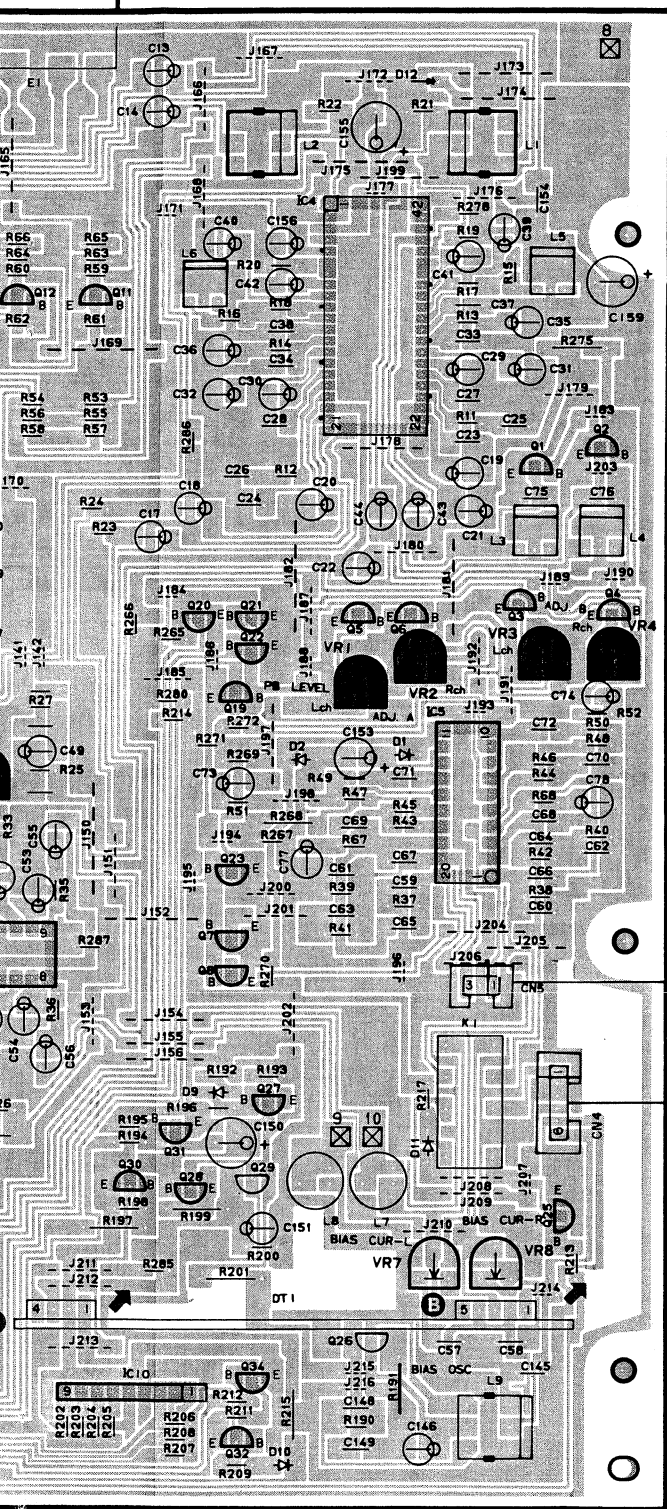
5

6

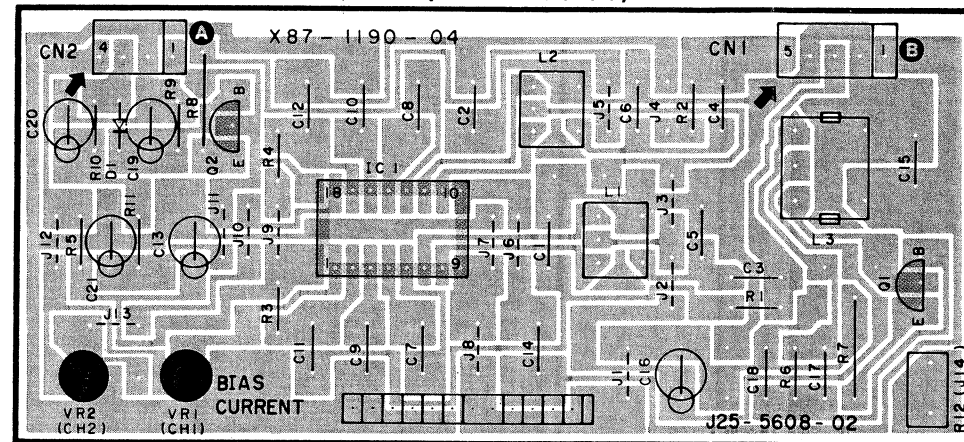
7



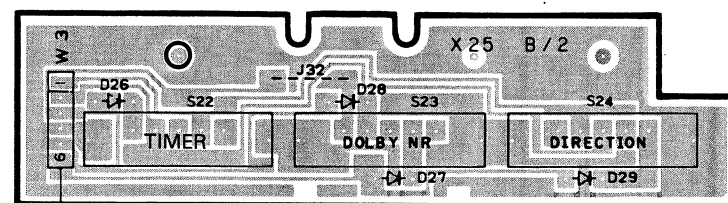
AY REC
IT IN



RECORDING AMPLIFIER UNIT (X87-1190-05)



B MECHA ASS'Y
D40-0882-05



RECORDING/PLAY AMPLIFIER UNIT (X28-2070-00)

Ref. No.		Address
IC	Q	
	1	3K
	2	3K
	3	3K
	4	3K
	5	3K
	6	3K
	7	5J
	8	5J
	9	4I
	10	4I
	11	2J
	12	2I
	13	3I
	14	3H
	15	3H
	16	6G
	17	6G
	18	6G
	19	4J
	20	3J
	21	3J
	22	4J
	23	4J
	24	4H
	25	5K
	27	5J
	28	5J
	30	5J
	31	5J
	32	6J
	34	6J
	35	4F
	36	4E
	37	2F
	38	2E
	39	3E
	40	3G
	41	4I
	42	4I
	43	4H
	44	4H
	45	3H
	46	5H
	47	4H
	48	4F
	49	5F
	50	5F
	51	5E
1		2I
2		2I
3		2H
4		2K
5		4K
7		6H
8		6I
9		5I
10		6J
11		2E
12		3H
13		5H
14		5F

RECORD AMP UNIT (X87-1190-05)

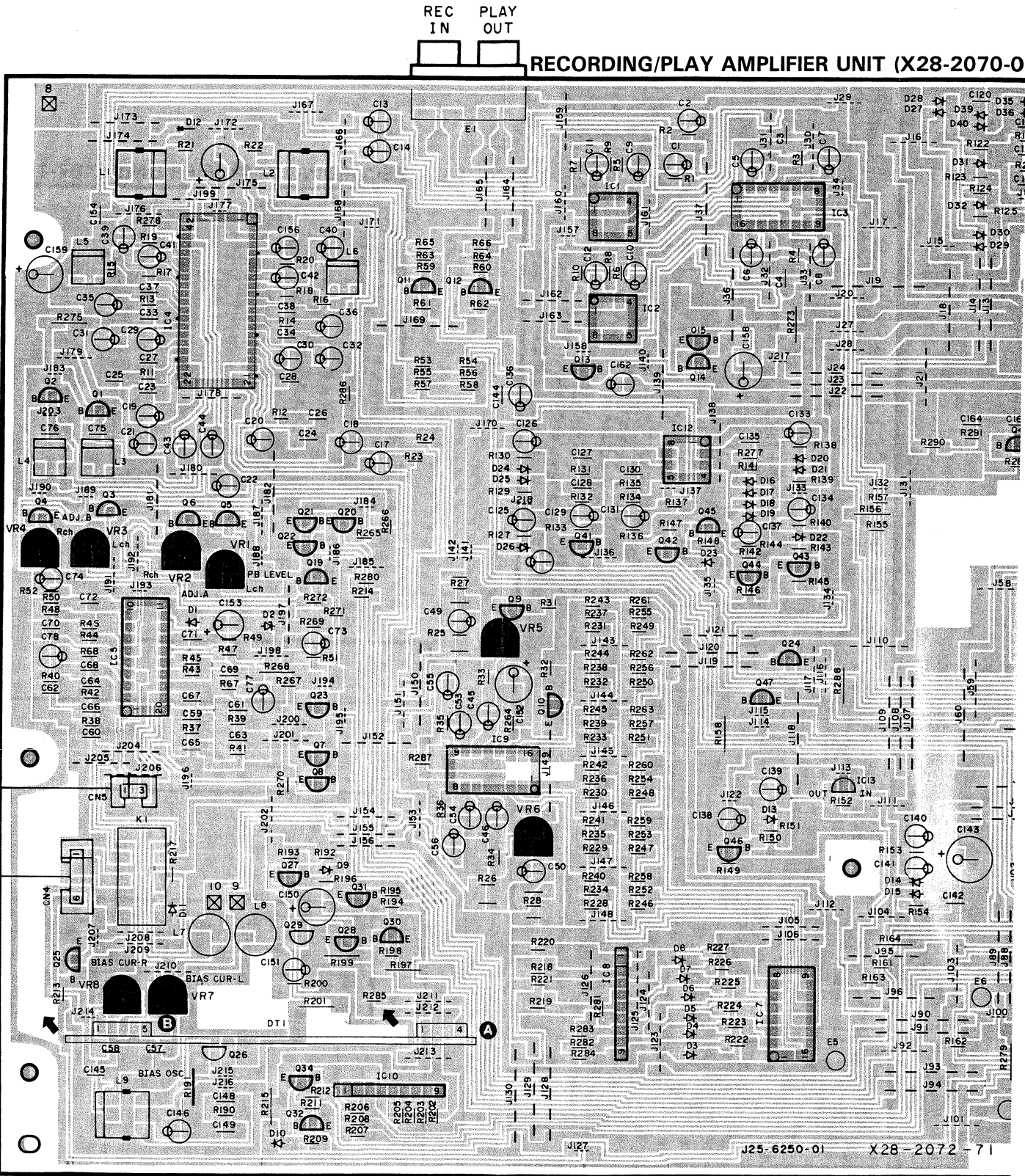
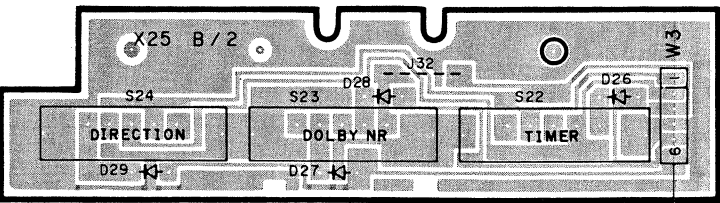
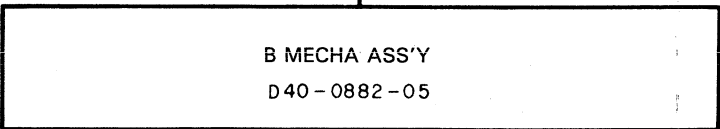
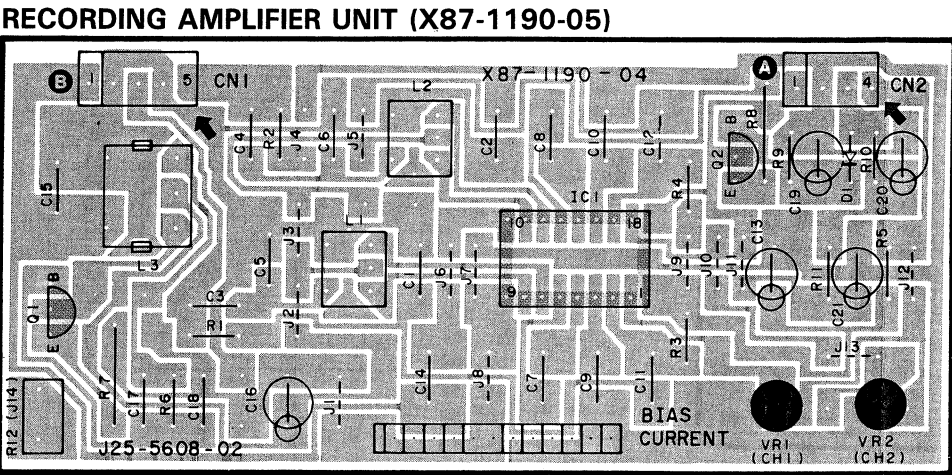
Ref. No.		Address
IC	Q	
	1	3O
	2	2M
1		3M

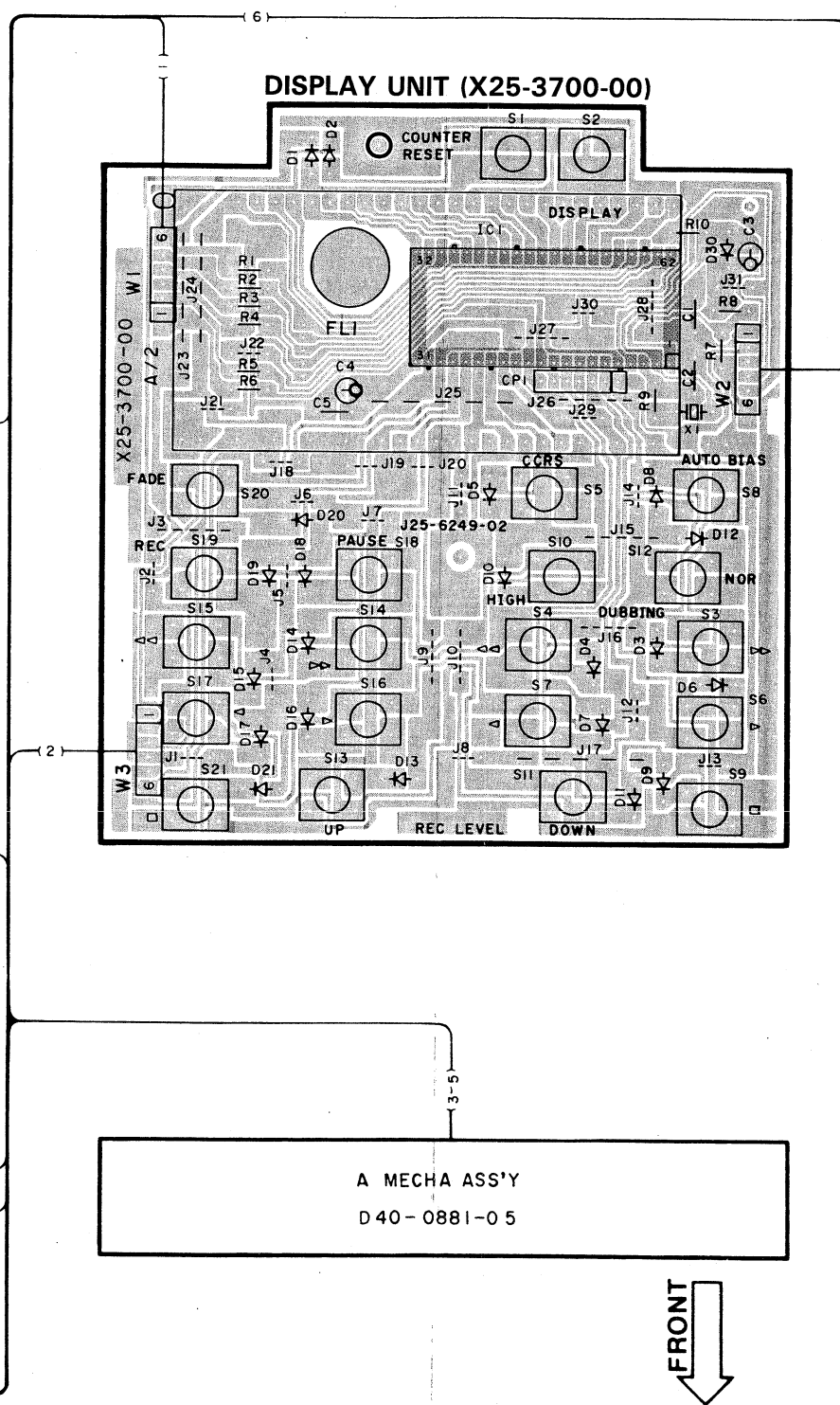
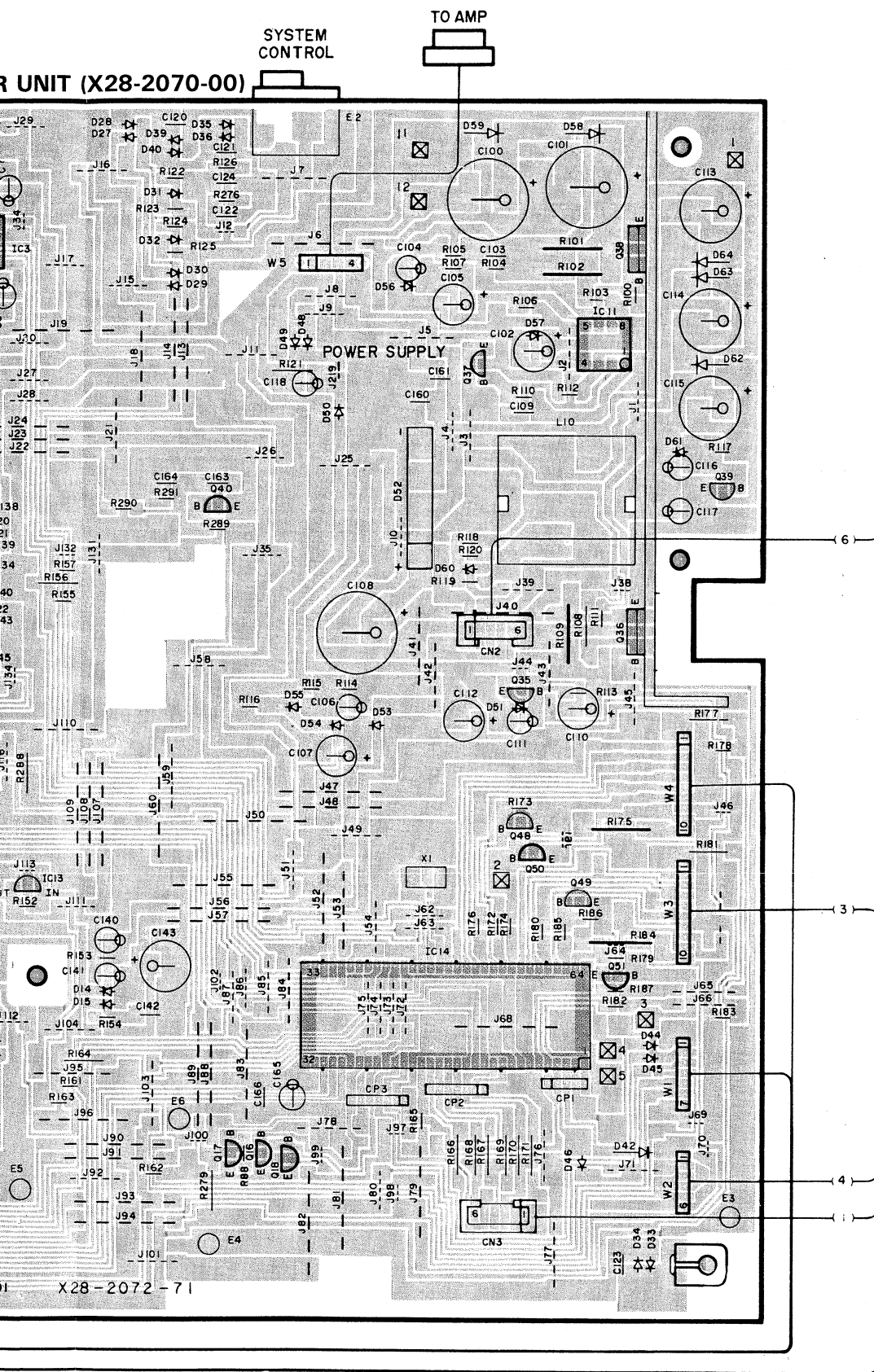
DISPLAY UNIT (X25-3700-00)

Ref. No.		Address
IC	Q	
1		3B

Refer to the schematic diagram for the values of resistors and capacitors.

PC BOARD (Foil side view)





RECORDING/PLAY AMPLIFIER UNIT
(X28-2070-00)

Ref. No.		Address
IC	Q	
	1	3Y
	2	3Y
	3	3Y
	4	3Y
	5	3Z
	6	3Z
	7	5Z
	8	5Z
	9	4AA
	10	4AA
	11	2AA
	12	2AA
	13	3AB
	14	3AB
	15	3AB
	16	6AD
	17	6AD
	18	6AD
	19	4Z
	20	3Z
	21	3Z
	22	4Z
	23	4Z
	24	4AC
	25	6Y
	26	6Z
	27	5Z
	28	5Z
	29	5Z
	30	5AA
	31	5AA
	32	6Z
	34	6Z
	35	4AE
	36	4AE
	37	2AE
	38	2AE
	39	3AF
	40	3AD
	41	4AB
	42	4AB
	43	4AC
	44	4AB
	45	3AB
	46	5AB
	47	4AB
	48	4AE
	49	5AE
	50	5AE
	51	5AE
1		2AB
2		2AB
3		2AB
4		2Z
5		4Z
7		6AC
8		6AB
9		5AA
10		6AA
11		2AE
12		3AB
13		5AC
14		5AD

RECORD AMP UNIT
(X87-1190-05)

Ref. No.		Address
IC	Q	
	1	3U
	2	2X
1		3W

DISPLAY UNIT (X25-3700-00)

Ref. No.		Address
IC	Q	
1		3AH

Refer to the schematic diagram for the values of resistors and capacitors.

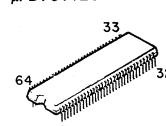
IC1,2 NJM4565D-D
 IC3 TC9213P
 IC4 HA12088ANT
 IC5 CXA1115BP
 IC7 BA6251
 IC8,10 TD62554S
 IC9 CXA1198AP
 IC11,12 NJM4565D
 IC13 M51951ASL
 IC14 μ PD75112CW-031

Q1~8,13,15~18,21~23,40,41,45,50,51
 DTC124EN
 2SD1302(S,T)
 Q14,24,47 DTA124EN
 Q19,20,25,28,30,31,34,43,44,46
 2SC945(A)(Q,P)
 or 2SC1740S(Q,R)
 or 2SA933S(Q,R)
 Q27,32,37,42 2SA733(A)(Q,P)
 or 2SC1740S(Q,R)
 or 2SA933S(Q,R)
 Q35 2SD863
 Q36 2SB941(Q,P)
 Q38 2SD1266(Q,P)
 Q39 2SB764
 Q48,49 2SC3246

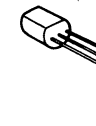
D1,3~11,13~25,27~36,39,40,42,44~46,
 48~50,53~55 ISS133 or HSS104
 D2 RDB.25(B2) or HZS8.25(B2)
 D12 ISS199
 D26 RD5.1ES(B2) or HZS5.1N(B2)
 D51 RD6.2ES(B2) or HZS6.2N(B2)
 D52 RBV-402LFA
 D56 RD3.9ES(B2) or HZS3.9N(B2)
 D57,61 RD30ES(B) or HZS30N(B)
 D58,59,62~64 S5566B
 D60 RD10ES(B) or HZS10N(B)

— SIGNAL LINE
 — RECORDING LINE
 — GND LINE
 — +B LINE
 — -B LINE

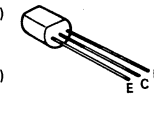
μ PD75112CW-031



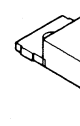
DTA124EN



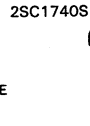
DTC124EN
 2SA733(A)
 2SB764
 2SC3246
 2SC945(A)
 2SD1302
 2SD863



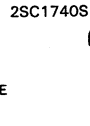
2SD1266



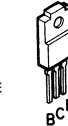
2SA933S



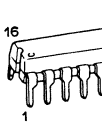
2SC1740S



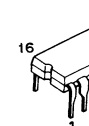
2SB941



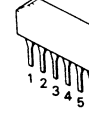
CXA1198AP



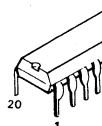
TC9213P



TD62554S



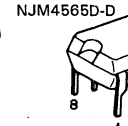
CXA1115BP



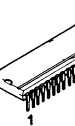
BA6251



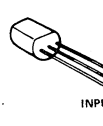
NJM4565D
 NJM4565D-D



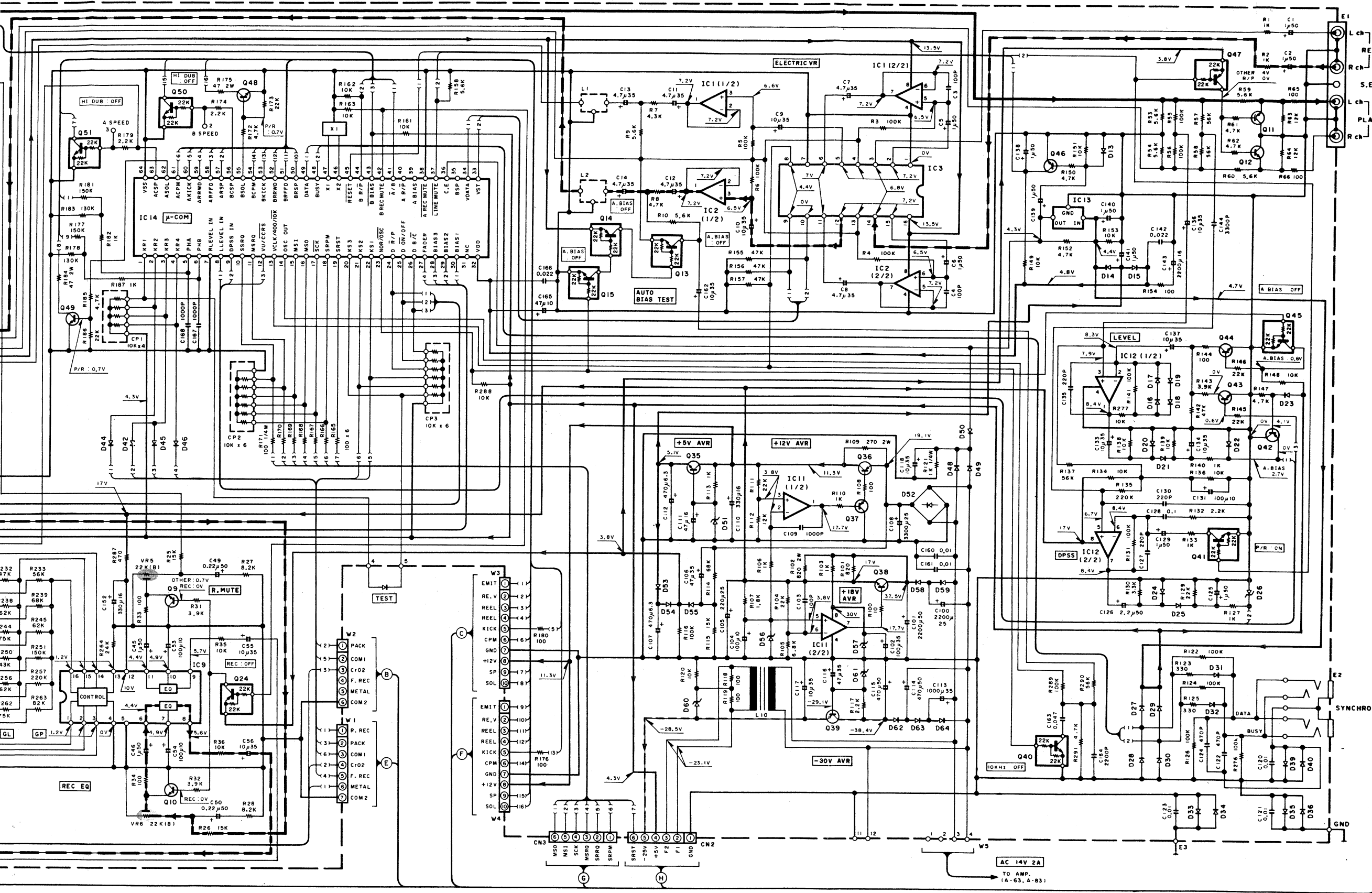
HA12088ANT



M51951ASL



OUTPUT
 INPUT
 GND



A
B
C
D
E
F
G
H
I
J

DC voltages are as measured with a high impedance voltmeter with a cassette loaded at playback mode. Values may vary slightly due to variations between individual instruments or/and units. Bias circuit DC voltages are as measured while in the record mode.

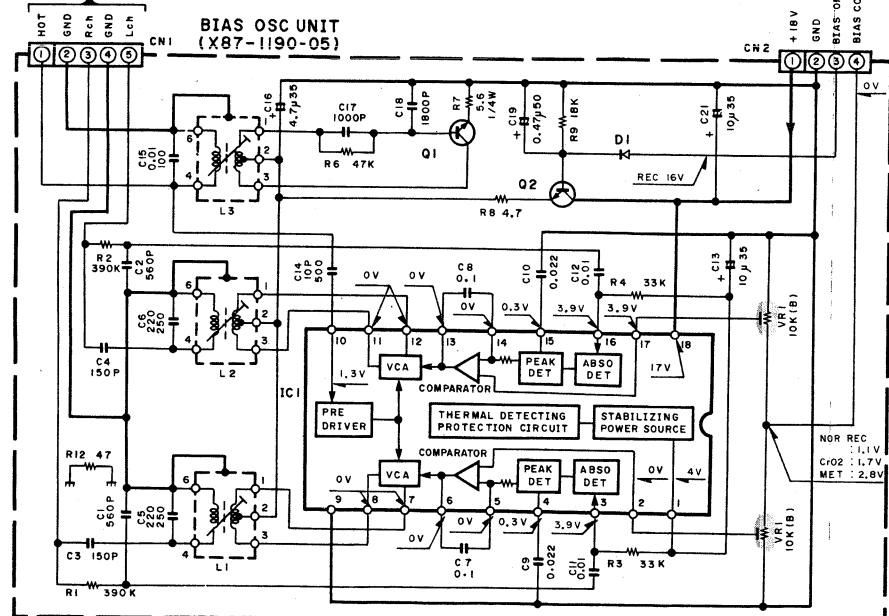
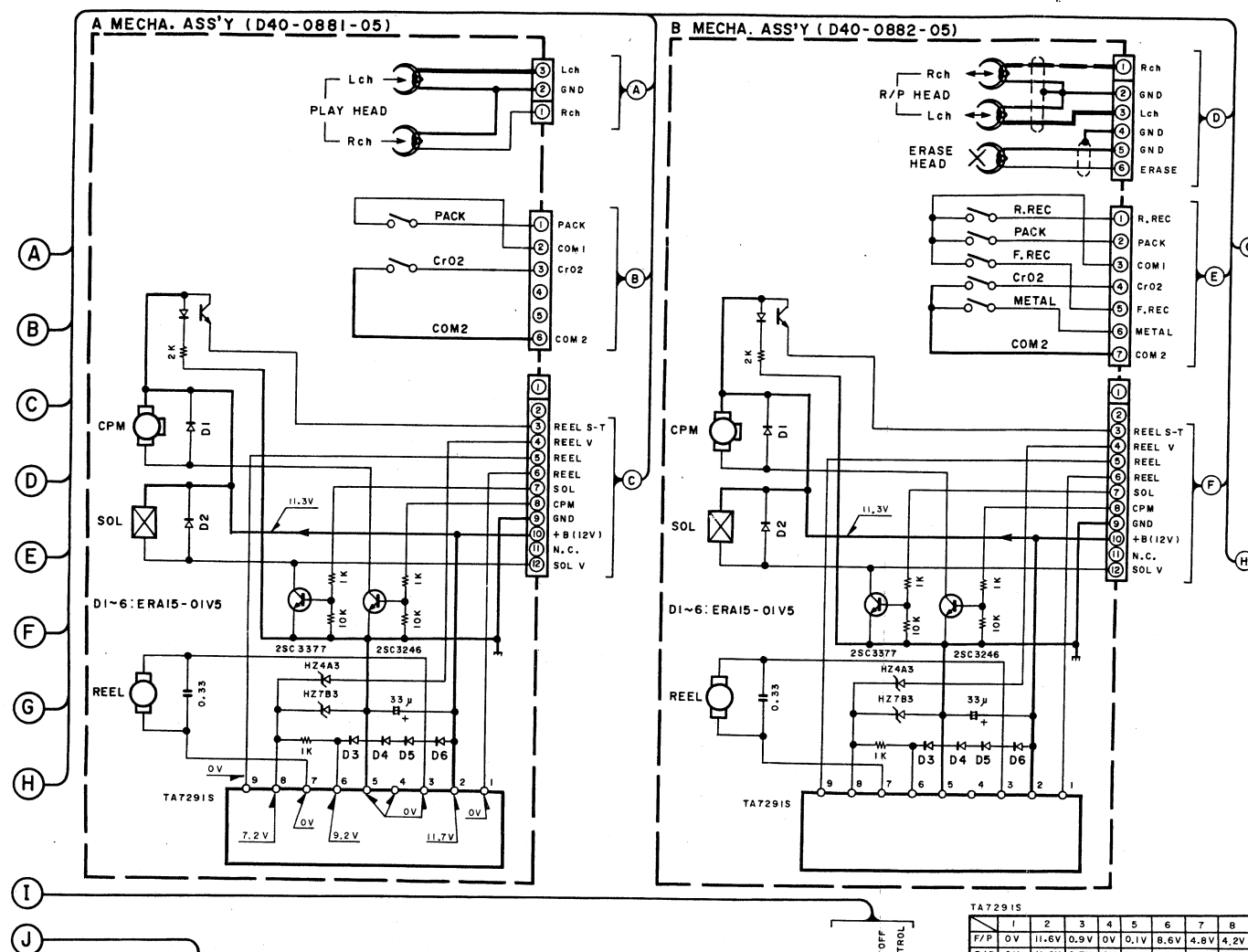
Les tensions c.c. doivent être mesurées avec un volt-mètre à haute impédance, une cassette étant insérée en mode de lecture. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels. Les tensions c.c. du circuit de polarité doivent être mesurées, l'appareil étant en mode d'enregistrement.

Die angegebenen Gleichspannungswerte wurden bei eingesetzter Cassette in der Wiedergabe mit einem hochohmigen Spannungsmesser gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig. Die angegebenen Gleichspannungswerte der Vornagnetisierungsschaltung wurden in der Aufnahme-Betriebsart gemessen.

ponents only with manufacturer's recommended parts (refer to parts list). **⚠** Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

X-83
KENWOOD

Y26-3000-52

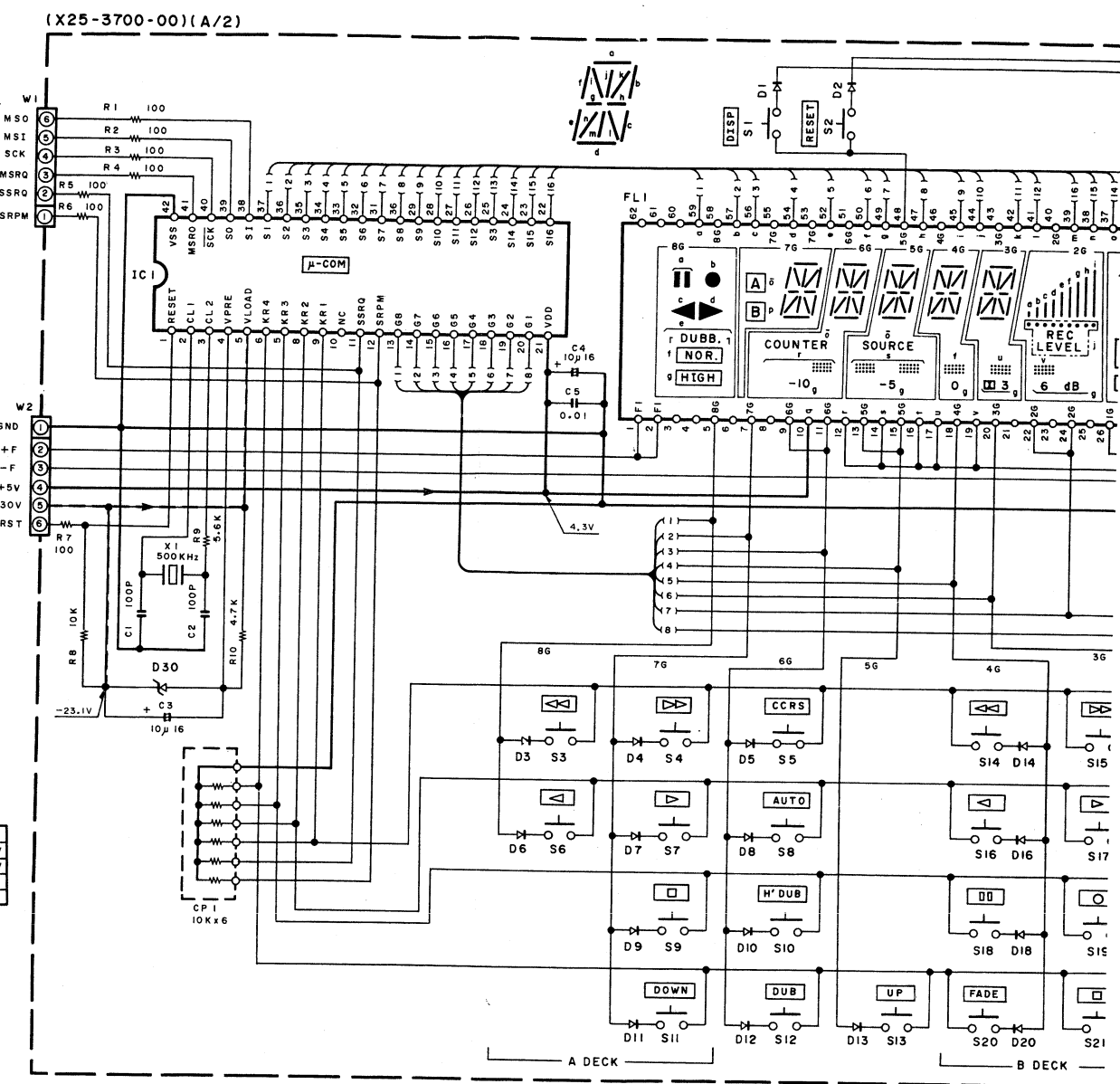


TA7291S

	1	2	3	4	5	6	7	8	9
F/P	OV	11.6V	0.9V	OV	0.1V	8.6V	4.8V	4.2V	4.8V
R/P	OV	11.6V	0.7V	OV	0.1V	8.7V	7.6V	7.1V	4.9V
FF	4.8V	11.6V	4.8V	OV	0.1V	8.6V	0.8V	4.2V	OV
RWD	4.9V	11.6V	7.6V	OV	0.1V	8.8V	0.7V	7.1V	OV

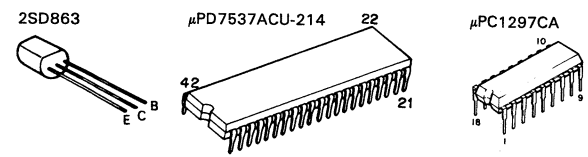
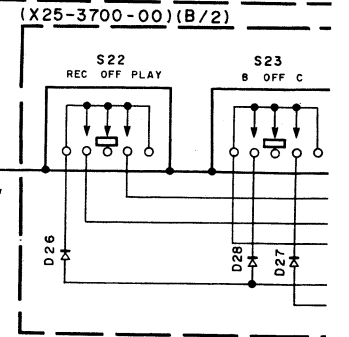
IC1 NOR REC

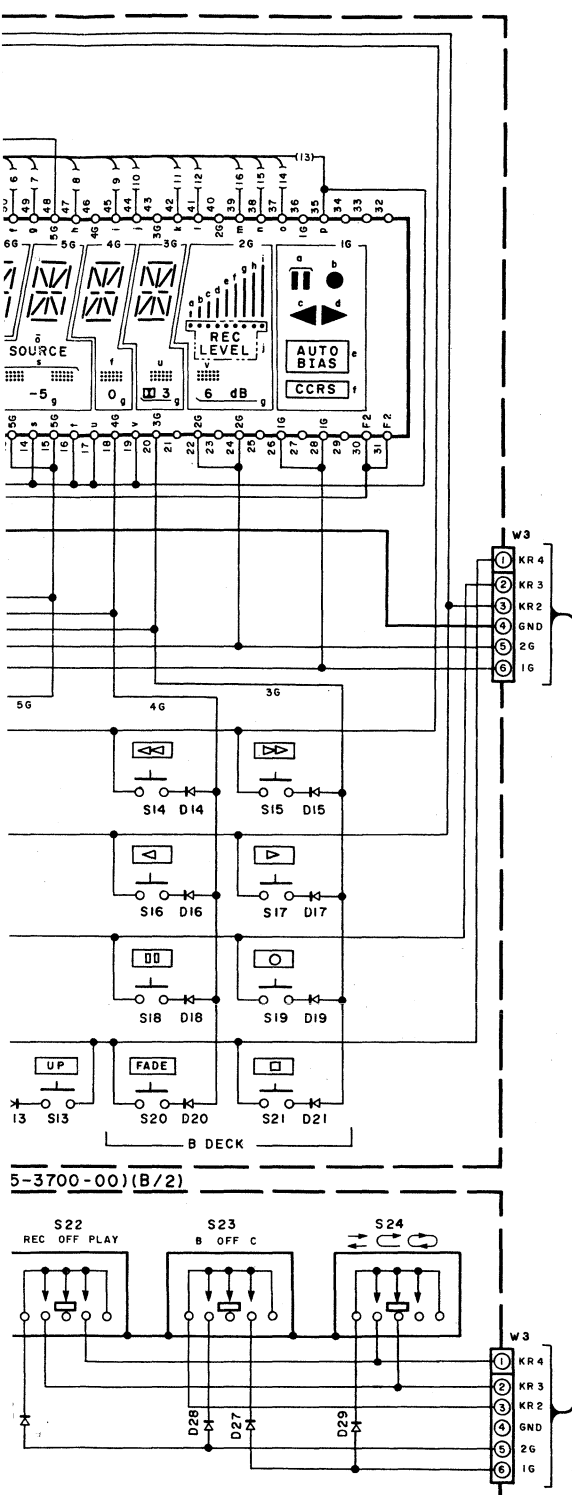
1	4V	10	1.4V
2	0.1V	11	5.8V
3	3.9V	12	5.8V
4	1.1V	13	2.2V
5	0.5V	14	0.4V
6	2.1V	15	1V
7	5.8V	16	3.9V
8	5.8V	17	0.5V
9	OV	18	17V



IC1: μPD7537ACU-214
 FL1: 8G-567Z
 DI: 21, 26~29
 D1: ISS133 or HSS104
 D30: RD10ES (B) or HZS10N (B)

— SIGNAL LINE
 — RECORDING LINE
 — GND LINE
 — +B LINE
 — -B LINE





CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).  Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

DC voltages are as measured with a high impedance voltmeter with a cassette loaded at playback mode. Values may vary slightly due to variations between individual instruments or/and units. Bias circuit DC voltages are as measured while in the record mode.

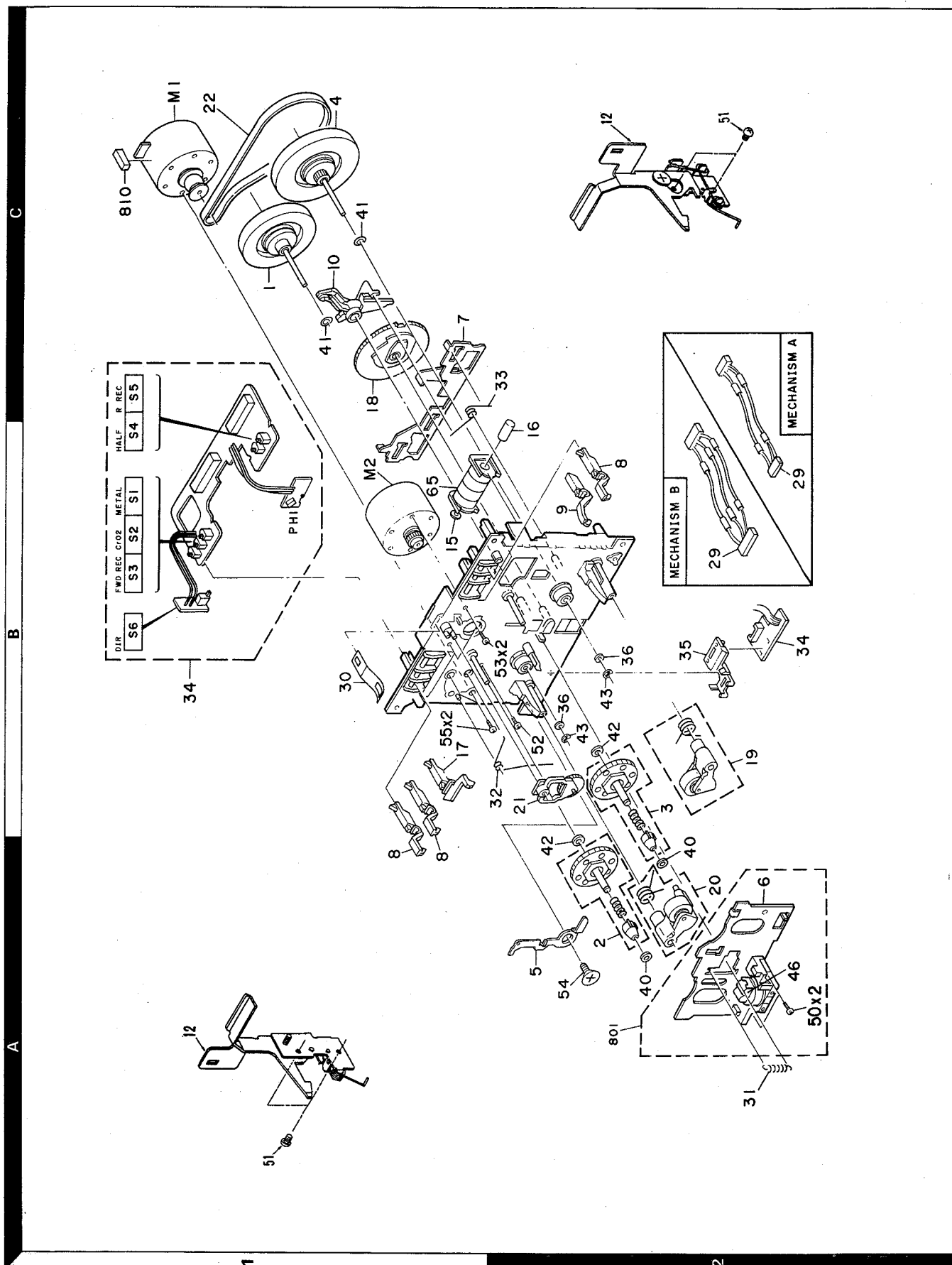
Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance, une cassette étant insérée en mode du lecture. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.

Les tensions c.c. du circuit de polarité doivent être mesurées, l'appareil étant en mode d'enregistrement.

Die angegebenen Gleichspannungswerte wurden bei eingesetzter Cassette in der Wiedergabe mit einem hochohmigen Spannungsmesser gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig. Die angegebenen Gleichspannungswerte der Vormagnetisierungsschaltung wurden in der Aufnahme-Betriebsart gemessen.

X-83
KENWOOD

EXPLODED VIEW (MECHANISM)



PARTS LIST

× New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C128 C129 C130 C131 C133, 134			CF92FV1H104J CE04KW1H010M CC45FSL1H221J CE04KW1A101M CE04KW1V100M	MF 0.10UF J ELECTRO 1.0UF 50WV CERAMIC 220PF J ELECTRO 100UF 10WV ELECTRO 10UF 35WV		
C135 C136, 137 C138-141 C142 C143			CC45FSL1H221J CE04KW1V100M CE04KW1H010M CK45FF1H223Z CE04KW0J222M	CERAMIC 220PF J ELECTRO 10UF 35WV ELECTRO 1.0UF 50WV CERAMIC 0.022UF Z ELECTRO 2200UF 6.3WV		
C144 C150 C152 C153 C154			CF92FV1H332J CE04KW1E101M CE04KW1C331M CE04KW1A101M CK45FF1H103Z	MF 3300PF J ELECTRO 100UF 25WV ELECTRO 330UF 16WV ELECTRO 100UF 10WV CERAMIC 0.010UF Z		
C155 C156 C158, 159 C160, 161 C162			CE04KW1A331M CE04KW1C220M CE04KW1C331M CK45FF1H103Z CE04KW1V100M	ELECTRO 330UF 10WV ELECTRO 22UF 16WV ELECTRO 330UF 16WV CERAMIC 0.010UF Z ELECTRO 10UF 35WV		
C163 C164 C165 C166 C167, 168			CF92FV1H473J CF92FV1H222J CE04KW1A470M CK45FF1H223Z CK45FB1H102K	MF 0.047UF J MF 2200PF J ELECTRO 47UF 10WV CERAMIC 0.022UF Z CERAMIC 1000PF K		
260 E1 E2	1F, 2F	*	E30-2586-05 E13-0446-05 E11-0188-05	CORD WITH CONNECTOR PHONE JACK (4P) MINIATURE PHONE JACK		
L1 ,2 L3 ,4 L5 ,6 L7 ,8 L10			L79-0720-05 L39-0126-05 L39-0106-05 L39-0171-05 L19-0059-05	LC FILTER TRAP COIL TRAP COIL TRAP COIL TRANSFORMER FOR CONVERTER		
X1 X1			L78-0209-05 L78-0218-05	RESONATOR (4.194MHZ) RESONATOR		
A	1F		N89-3008-45	BINDING HEAD TAPTITE SCREW		
CP1 CP2 ,3 R101, 102 R109 R175			R90-0809-05 R90-0810-05 RS14KB3D821J RS14KB3D271J RS14KB3D470J	MULTIPLE RESISTOR MULTIPLE RESISTOR FL-PROOF RS 820 J 2W FL-PROOF RS 270 J 2W FL-PROOF RS 47 J 2W		
R184 VR1 -6			RS14KB3D470J R12-3128-05	FL-PROOF RS 47 J 2W TRIMMING POT. (22K, 7t)		
K1		*	S51-2089-05	MAGNETIC RELAY		
D1 D1 D2 D2 D3 -11			HSS104 1SS133 HZS8.2S(B2) RD8.2JS(B2) HSS104	DIODE DIODE ZENER DIODE ZENER DIODE DIODE		
D3 -11 D12 D13 -25			1SS133 1SS199 HSS104	DIODE DIODE DIODE		

E: Scandinavia & Europe K: USA

P: Canada

U: PX(Far East, Hawaii) T: England

M: Other Areas

UE: AAFES(Europe)

X: Australia

⚠ indicates safety critical components.

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
D13 -25			1SS133	DIODE		
D26			HZS5.1N(B2)	ZENER DIODE		
D26			RD5.1ES(B2)	ZENER DIODE		
D27 -36			HSS104	DIODE		
D27 -36			1SS133	DIODE		
D39 ,40			HSS104	DIODE		
D39 ,40			1SS133	DIODE		
D42			HSS104	DIODE		
D42			1SS133	DIODE		
D44 -46			HSS104	DIODE		
D44 -46			1SS133	DIODE		
D48 -50			HSS104	DIODE		
D48 -50			1SS133	DIODE		
D51			HZS6.2N(B2)	ZENER DIODE		
D51			RD6.2ES(B2)	ZENER DIODE		
D52			RBV-402LFA	DIODE		
D53 -55			HSS104	DIODE		
D53 -55			1SS133	DIODE		
D56			HZS3.9N(B2)	ZENER DIODE		
D56			RD3.9ES(B2)	ZENER DIODE		
D57			HZS30N(B)	ZENER DIODE		
D57			RD30ES(B)	ZENER DIODE		
D58 ,59			S5566B	DIODE		
D60			HZS10ES(B)	ZENER DIODE		
D60			RD10ES(B)	ZENER DIODE		
D61			HZS30N(B)	ZENER DIODE		
D61			RD30ES(B)	ZENER DIODE		
D62 -64			S5566B	DIODE		
IC1 ,2			NJM4565D-D	IC		
IC3			TC9213P	IC(2CH ELECTRONIC VOLUME)		
IC4			HA12088ANT	IC(DOLBY B/C NOISE REDUCTION)		
IC5			CXA1115BP	IC(PLAY/BACK AMP)		
IC7			BA6251	IC(7CH TRANSISTOR ARRAY)		
IC8			TD62554S	IC(4CH TRANSISTOR ARRAY)		
IC9			CXA1198AP	IC(CASSETTE DECK REC EQUALIZER)		
IC10			TD62554S	IC(4CH TRANSISTOR ARRAY)		
IC11,12			NJM4565D	IC(OP AMP X2)		
IC13			M51951ASL	IC(SYSTEM RESET)		
IC14			UPD75112CW-031	IC		
Q1 -8			DTC124EN	DIGITAL TRANSISTOR		
Q9 -12			2SD1302(S,T)	TRANSISTOR		
Q13			DTC124EN	DIGITAL TRANSISTOR		
Q14			DTA124EN	DIGITAL TRANSISTOR		
Q15 -18			DTC124EN	DIGITAL TRANSISTOR		
Q19 ,20			2SC1740S(Q,R)	TRANSISTOR		
Q19 ,20			2SC945(A)(Q,P)	TRANSISTOR		
Q21 -23			DTC124EN	DIGITAL TRANSISTOR		
Q24			DTA124EN	DIGITAL TRANSISTOR		
Q25			2SC1740S(Q,R)	TRANSISTOR		
Q25			2SC945(A)(Q,P)	TRANSISTOR		
Q27			2SA733(A)(Q,P)	TRANSISTOR		
Q27			2SA933S(Q,R)	TRANSISTOR		
Q28			2SC1740S(Q,R)	TRANSISTOR		
Q28			2SC945(A)(Q,P)	TRANSISTOR		
Q30 ,31			2SC1740S(Q,R)	TRANSISTOR		

E: Scandinavia & Europe K: USA

P: Canada

U: PX(Far East, Hawaii)

T: England

M: Other Areas

UE: AAFES(Europe)

X: Australia

⚠ indicates safety critical components.

PARTS LIST

× New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
Q30 ,31 Q32 Q32 Q34 Q34			2SC945(A)(Q,P) 2SA733(A)(Q,P) 2SA933S(Q,R) 2SC1740S(Q,R) 2SC945(A)(Q,P)	TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q35 Q36 Q37 Q37 Q38			2SD863(E,F) 2SB941(Q,P) 2SA733(A)(Q,P) 2SA933S(Q,R) 2SD1266(Q,P)	TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q39 Q40 ,41 Q42 Q42 Q43 ,44			2SB764 DTC124EN 2SA733(A)(Q,P) 2SA933S(Q,R) 2SC1740S(Q,R)	TRANSISTOR DIGITAL TRANSISTOR TRANSISTOR TRANSISTOR TRANSISTOR		
Q43 ,44 Q45 Q46 Q46 Q47			2SC945(A)(Q,P) DTC124EN 2SC1740S(Q,R) 2SC945(A)(Q,P) DTA124EN	TRANSISTOR DIGITAL TRANSISTOR TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR		
Q48 ,49 Q50 ,51			2SC3246 DTC124EN	TRANSISTOR DIGITAL TRANSISTOR		
RECORDING AMPLIFIER UNIT (X87-1190-05)						
C1 ,2 C3 ,4 C5 ,6 C7 ,8 C9 ,10			CK45FB1H561K CC45FSL1H151J C91-0359-05 C91-0700-05 CK45FF1H223Z	CERAMIC 560PF K CERAMIC 150PF J POLYSTY 220PF J CERAMIC 0.1UF J CERAMIC 0.022UF Z		
C11 ,12 C13 C14 C15 C16			CK45FF1H103Z CE04KW1V100M CC45FSL2H100D CQ93HP2A103J CE04KW1V4R7M	CERAMIC 0.010UF Z ELECTRO 10UF 35WV CERAMIC 10PF D MYLAR 0.010UF J ELECTRO 4.7UF 35WV		
C17 C18 C19 C21			CF92FV1H102J CF92FV1H182J CE04KW1HR47M CE04KW1V100M	MF 1000PF J MF 1800PF J ELECTRO 0.47UF 50WV ELECTRO 10UF 35WV		
L1 ,2 L3			L32-0377-05 L32-0380-05	BIAS OSCILATING COIL BIAS OSCILATING COIL		
R7 R8 VR1 ,2			RD14GB2E5R6J R92-0341-05 R12-3100-05	FL-PROOF RD 5.6 J 1/4W CARBON FILM RESISTOR TRIMMING POT.(10K 27)		
D1 D1 IC1 Q1 ,2			1SS133 1SS176 UPC1297CA 2SD863(E,F)	DIODE DIODE IC(DOL HX PRO SYSTEM) TRANSISTOR		
MECHANISM ASS'Y (D40-0881-05: A, D40-0882-05: B)						
1 1 2 3 4 4	1C 1C 2A 2B 1C 1C	* * *	D01-0119-08 D01-0120-08 D03-0231-08 D03-0232-08 D01-0112-08 D01-0118-08	FLY WHEEL ASSY FLY WHEEL ASSY REEL DISK ASSY REEL DISK ASSY FLY WHEEL ASSY FLY WHEEL ASSY		A B B A

E: Scandinavia & Europe K: USA P: Canada

U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

A: A DECK
B: B DECK

⚠ indicates safety critical components.

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
5	2A		D10-2057-08	TENSION ARM		A
5	2A		D10-2226-08	TENSION ARM		B
6	2A		D10-2339-08	SLIDER		A
6	2A	*	D10-2374-08	SLIDER		B
7	1C		D10-2334-08	SLIDER		
8	1A, 2B		D10-2335-08	LEVER (REC, Cr02)		
9	2B		D10-2336-08	LEVER (PACK)		
10	1C		D10-2338-08	PLAY ARM		
12	2C	*	D10-2371-08	EJECT LEVER ASSY		A
12	1A	*	D10-2373-08	EJECT LEVER ASSY		B
15	1B		D10-2340-08	ROD		
16	2B		D10-2341-08	ROD		
17	1B	*	D10-2369-08	LEVER (METAL)		B
18	1C		D13-0812-08	GEAR		
19	2B	*	D14-0311-08	PINCH ROLLER ASSY		
20	2A	*	D14-0312-08	PINCH ROLLER ASSY		
21	2B		D14-0304-08	IDLER ASSY		
22	1C		D16-0287-08	BELT		
29	2B	*	E31-7494-08	CONNECTING WIRE		A
29	2B	*	E31-7496-08	CONNECTING WIRE		B
30	1B	*	G02-0947-08	FLAT SPRING		A
31	2A		G01-2398-08	TENSION SP		
32	2B		G01-2422-08	TENSION SP		B
32	2B	*	G01-2439-08	TENSION SP		A
33	2C		G01-2400-08	TORSION SP		
34	1B	*	J25-6367-08	PRINTED WIRING BOARD		B
34	1B	*	J25-6368-08	PRINTED WIRING BOARD		A
35	2B	*	J19-3253-08	READ HOLDER		
36	2B		N19-1214-08	FLAT WASHER (2.6X 0.5)		
40	2A		N19-0904-08	FLAT WASHER (1.7X 0.25)		
41	1C		N19-0905-08	FLAT WASHER (2.6X 0.25)		
42	2A, 2B		N19-1095-08	FLAT WASHER (2.1X 0.25)		
43	2B		N29-0205-04	E TYPE RETAINING RING		A
46	2A		T31-0056-08	PB HEAD		
46	2A		T39-0010-08	REC/PB/ERASE HEAD		B
50	2A		N09-2585-08	SCREW (M2X 5)		
51	2A	*	N09-2730-08	SCREW (M2X 9)		
52	2B		N09-2701-08	SCREW (3X 8)		
53	2B	*	N09-2729-08	SCREW (M2.6X 6)		
54	2A		N09-1864-08	SCREW		
55	1B		N09-2700-08	SCREW (M2.6X 5)		
65	1B		T94-0216-08	SOLENOID		
S1 -5	1B		S90-0105-08	PUSH SWITCH		B
S1 ,2	1B		S90-0105-08	PUSH SWITCH		A
M1	1C		T42-0535-08	DC MOTOR ASSY (MAIN)		
M2	1B		T42-0534-08	DC MOTOR ASSY (REEL)		
PH1	1B		GP2S04B	PHOTO SENSOR		
PH1	1B		SPI-335-34	PHOTO SENSOR		

E: Scandinavia & Europe K: USA

P: Canada

U: PX(Far East, Hawaii)

T: England

M: Other Areas

UE: AAFES(Europe)

X: Australia

A: A DECK

B: B DECK

⚠ indicates safety critical components.

SPECIFICATIONS

X-83

Type.....	4 track 2 channel stereo
Heads	
Playback/Record head (B deck) ...	1
Playback head (A deck)	1
Erasing head (B deck)	1
Motors.....	2 (each deck)
First winding time (A deck)	Approx. 90 seconds with C-60 tape
Frequency response	
Normal tape	30 Hz to 15,000 Hz ± 3 dB
CrO ₂ tape	30 Hz to 16,000 Hz ± 3 dB
Metal tape	30 Hz to 16,000 Hz ± 3 dB
Signal to noise ratio (A deck)	
Dolby C NR ON	75 dB (Metal tape)
Dolby B NR ON	67 dB (Metal tape)
Dolby NR OFF	58 dB (Metal tape)
Harmonic distortion	Less than 1% (at 1 kHz, 0 dB, 3rd H.D. Metal/Normal tape)
Wow and flutter	0.08% (W.R.M.S.) ± 0.18% (DIN)
General	
Dimension	W: 360 mm H: 119 mm D: 354 mm
Weight (net)	4.0 kg

KENWOOD follows a policy of continuous advancements in development.
For this reason specifications may be changed without notice.
DOLBY and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
Noise reduction circuit made under license from Dolby Laboratories Licensing Corporation.

KENWOOD poursuit une politique de progrès constants en ce qui concerne le développement.
Pour cette raison, les spécifications sont sujettes à modifications sans préavis.
La marque DOLBY et le double "D" sont des marques déposées des Dolby Laboratories.
Le système de réduction du bruit de fond est fabriqué sous licence des Dolby Laboratories.

KENWOOD strebt ständige Verbesserungen in der Entwicklung an.
Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.
DOLBY und Doppel-D-Symbol sind eingetragene Warenzeichen der Dolby Laboratories.
Dolby-Rauschunterdrückung mit Lizenz der Dolby Laboratories gefertigt.

Note:

Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on the USA (K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

KENWOOD CORPORATION

Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

KENWOOD U.S.A. CORPORATION

2201 East Dominguez Street, Long Beach, CA 90810;
550 Clark Drive, Mount Olive, NJ 07828, U.S.A.

KENWOOD ELECTRONICS CANADA INC.

P.O. BOX 1075, 959 Gana Court, Mississauga, Ontario, Canada L4T 4C2

TRIO-KENWOOD U.K. LTD.

KENWOOD House, Dwight Road, Watford, Herts., Wd1 8eb United Kingdom

KENWOOD ELECTRONICS BENELUX N.V.

Mechelsesteenweg 418 B-1930 Zaventem, Belgium

KENWOOD ELECTRONICS DEUTSCHLAND GMBH

Rembrücker-Str. 15, 6056 Heusenstamm, West Germany

TRIO-KENWOOD FRANCE S.A.

13 Boulevard Ney, 75018 Paris, France

KENWOOD LINEAR S.p.A.

20125, MILANO-VIA ARBE, 50, ITALY

KENWOOD ELECTRONICS AUSTRALIA PTY, LTD. (INCORPORATED IN NSW)

4E Woodcock Place, Lane Cove, N.S.W. 2066, Australia

KENWOOD & LEE ELECTRONICS, LTD.

Wang Kee Building, 4th Floor, 34-37, Connaught Road, Central, Hong Kong